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January-February 2014
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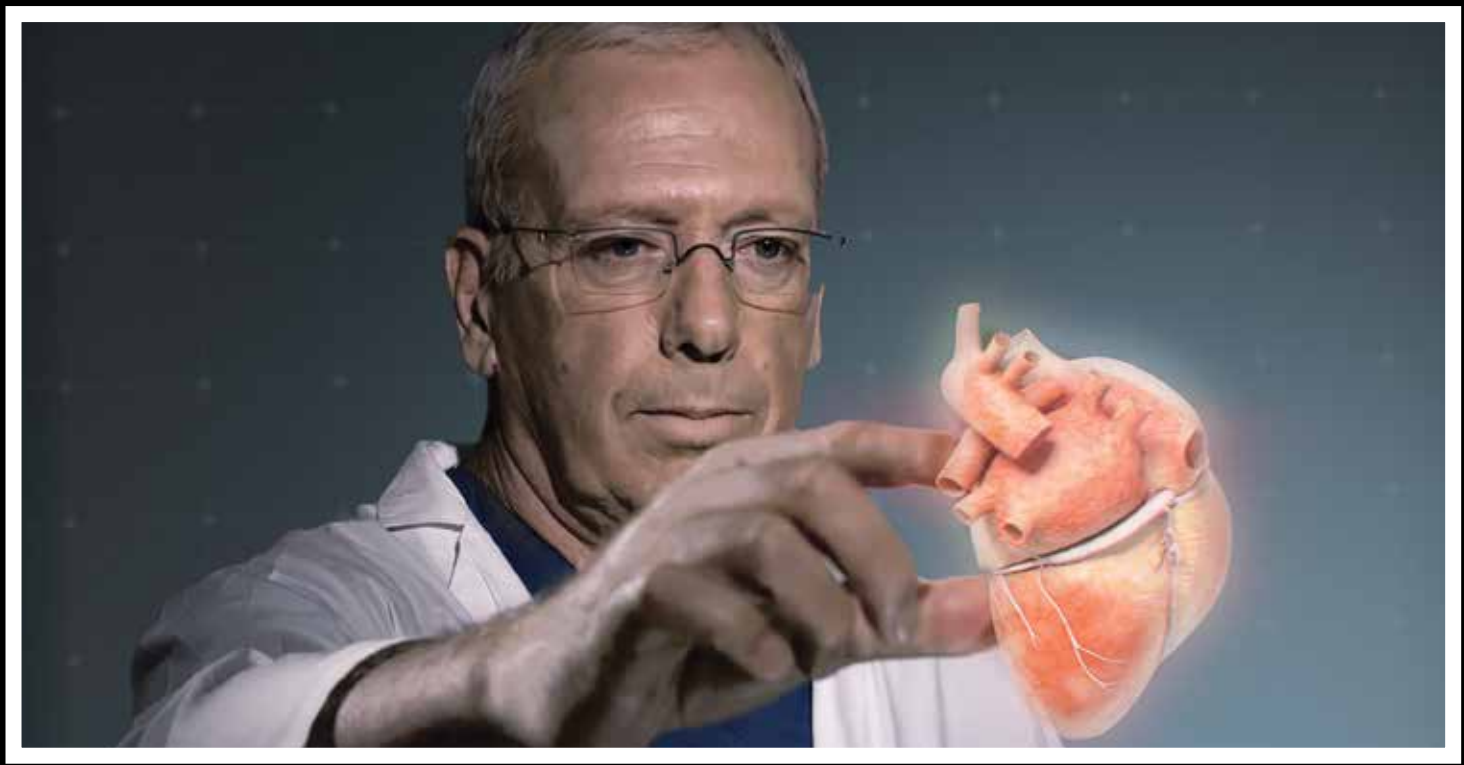
Advances in Imaging

- Philips tests live 3D holographic visualisation
- GE's new Revolution CT scans heart in one beat
- Siemens' Symbia Intevo integrates SPECT & CT



60th WHO EMR conference highlights

- Polio outbreak in Syria
- Shocking road death stats

Houston Methodist Global Health Care Services – *Middle East Heath* Roundtable looks at improving healthcare workforce education in the region

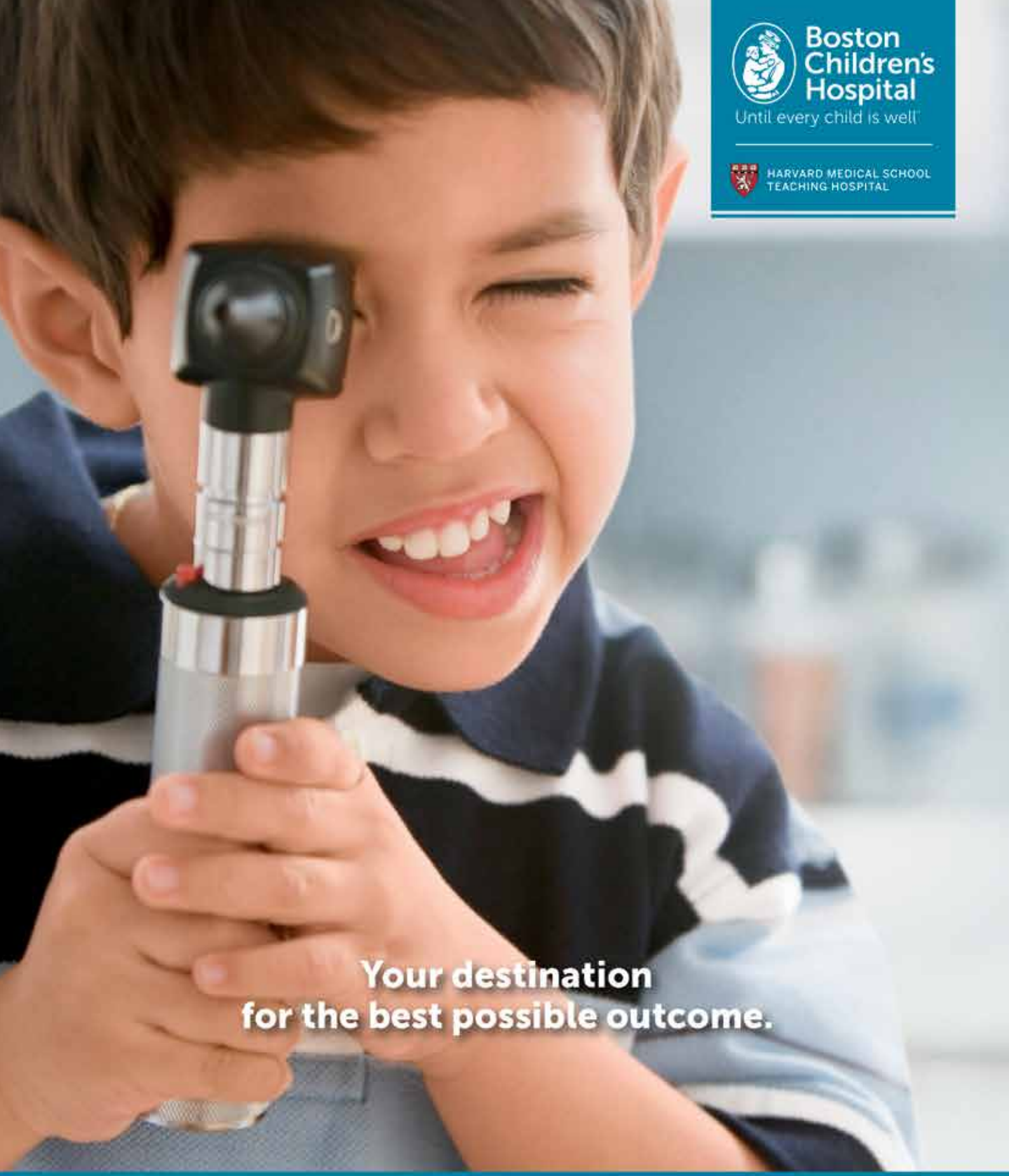
MERS-CoV found in camels

Death toll from coronavirus continues to rise in Gulf States

In the News

- Dubai makes expat health insurance mandatory
- EU launches universal flu vaccine research project
- New HIV strain leads to faster AIDS development
- Add bone deterioration to diabetes complications

Bahrain BD3, **Egypt** £E40, **Iran** IRR75, **Iraq** IQD9,400, **Jordan** JD5, **Kuwait** KD3, **Lebanon** LBP12,000, **Oman** RO3, **Qatar** QR30, **Saudi Arabia** SR30, **Syria** £S400, **UAE** Dh30, **Yemen** YR1,600



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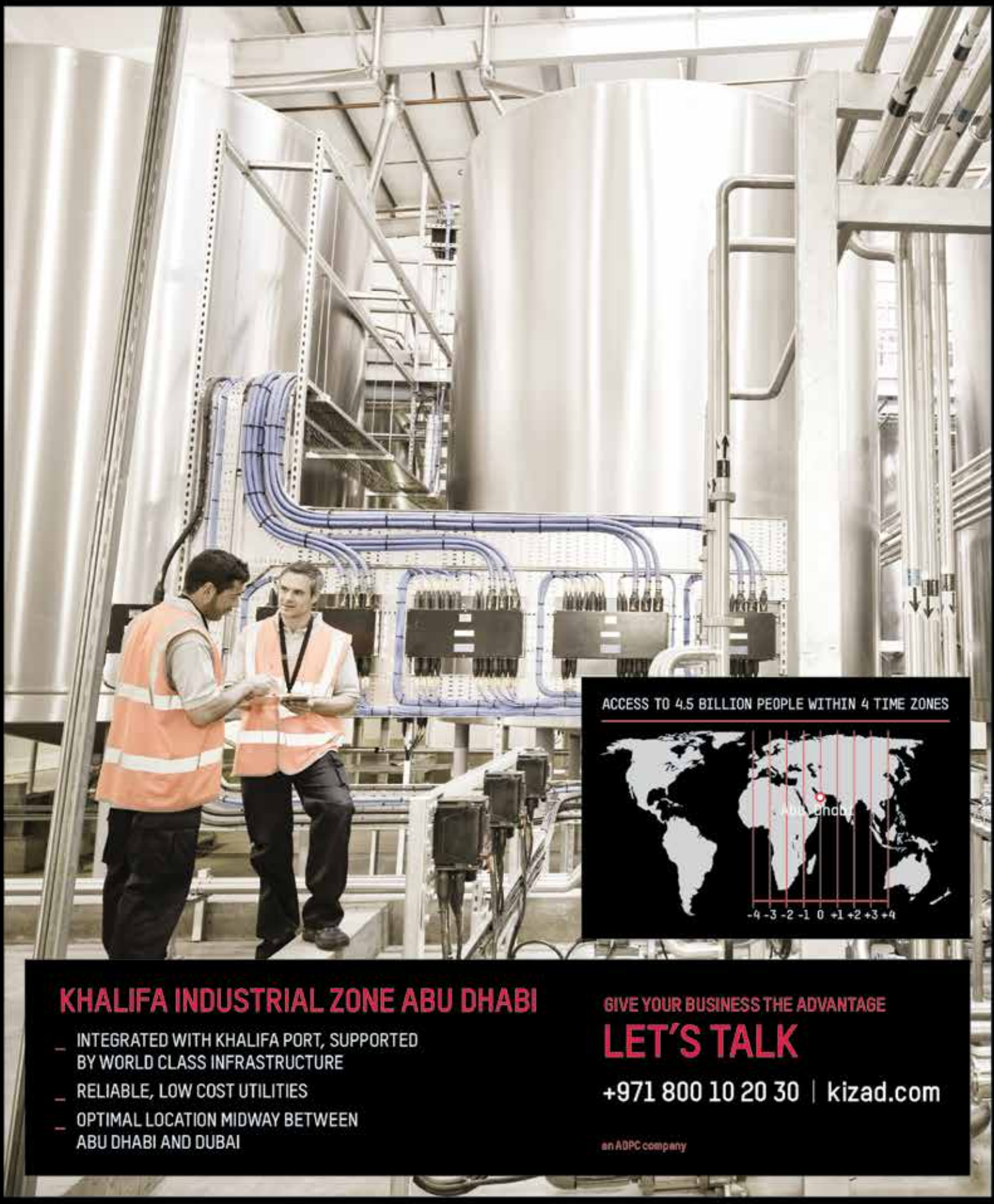

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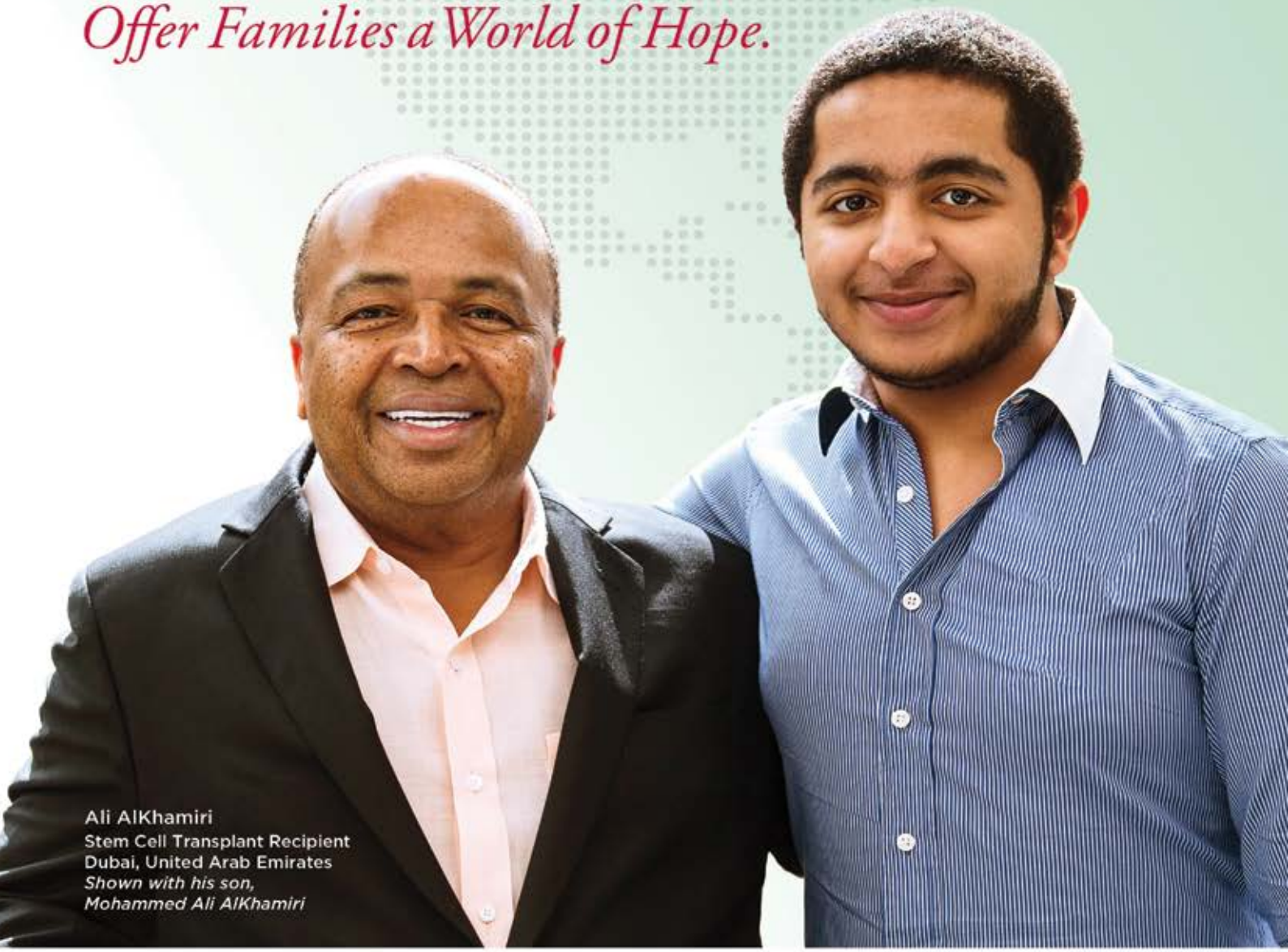

Ali AlKhamiri
Stem Cell Transplant Recipient
Dubai, United Arab Emirates
Shown with his son,
Mohammed Ali AlKhamiri

As general manager of the Dubai Equestrian Club, Ali AlKhamiri lived an active life. Then one day, a horrific pain ran through his bones. Suddenly, he couldn't sleep or function.

Ali turned to Todd Zimmerman, MD, at the University of Chicago Medicine. He diagnosed Ali with multiple myeloma, a cancer of the plasma cells. He treated him with chemotherapy, followed by a stem cell transplantation, a specialty of the University of Chicago Medicine. Today, Ali is back at home in Dubai, pain-free and enjoying working, riding and spending time with his family.

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Prognosis

Tech Evolution

We have another bumper issue, thanks to all the advertising support. From the publisher and the editorial team – we wish you all a healthy, happy and prosperous 2014.

This is always an interesting time of year as we see what new technology is being introduced by the major medical device manufacturers who often wait for the three large medical expos, Medica (in November), RSNA (in December) and Arab Health (in January) to launch their new products on the market. In this issue, in the focus on Cardiology, Computed Tomography and in the extensive Product News section, we look at some of these innovative products. It is always impressive to witness this evolution in technology on show at these exhibitions year on year. Advances appear to come in two spheres – either improvements in the technology to enhance its capability, Philips' holographic visualisation is a good example, or developments that enable the technology to be manufactured at lower cost, which then enables greater access to these devices.

The WHO Eastern Mediterranean Region held their annual meeting in Muscat at the end of October where a number of important public health issues affecting the region were raised – in particular the polio outbreak in Syria, which could have wider regional implications. We look at this issue, the new road traffic safety report – with it shocking regional statistics – and the MERS coronavirus, which continues to take its toll across the Gulf States, albeit slowly.

Also in this issue we speak to the head of the Thalassaemia International Federation about the little known non-transfusion dependent thalassaemia. We do this on the occasion of an online initiative – NTDT Voices – to raise aware of the condition. And we speak to Professor Heinz Josef Lenz, an eminent cancer research specialist, about colorectal cancer and whether it can be prevented.

Each year we partner with Houston Methodist Global Health Services to host a roundtable discussion on a pertinent issue in regional healthcare. The 2013 roundtable talks looked at improving health workforce education. A summary of the talks appears in this issue.

Good Heath

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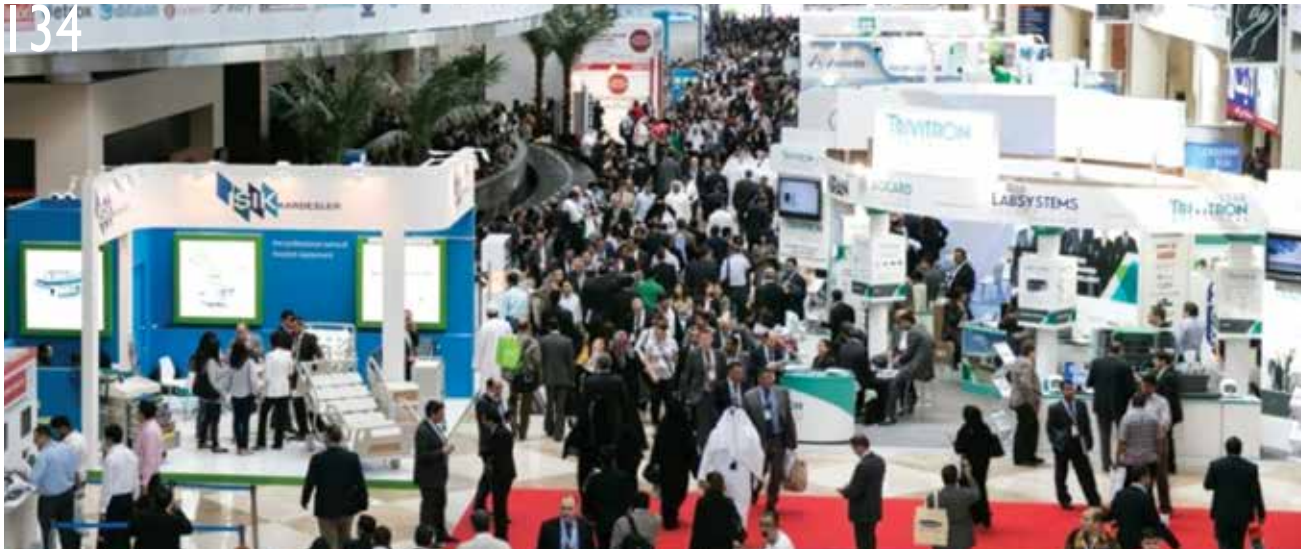

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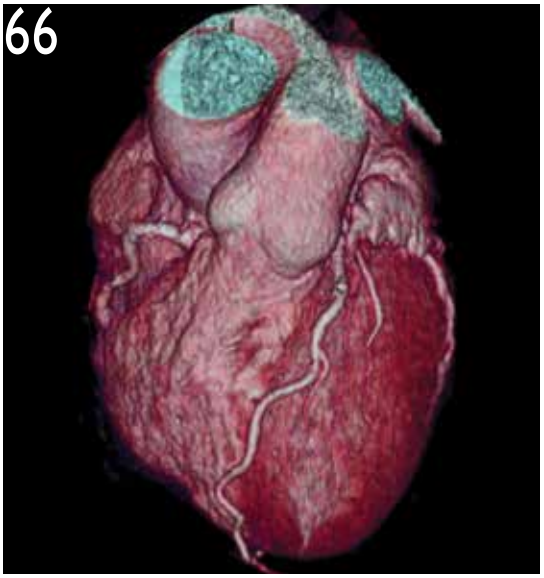

Cover image
Philips Healthcare recently announced that they have completed a clinical study that has demonstrated the feasibility of using an innovative live 3D holographic visualization and interaction technology to guide minimally-invasive structural heart disease procedures. See full story on page 60.


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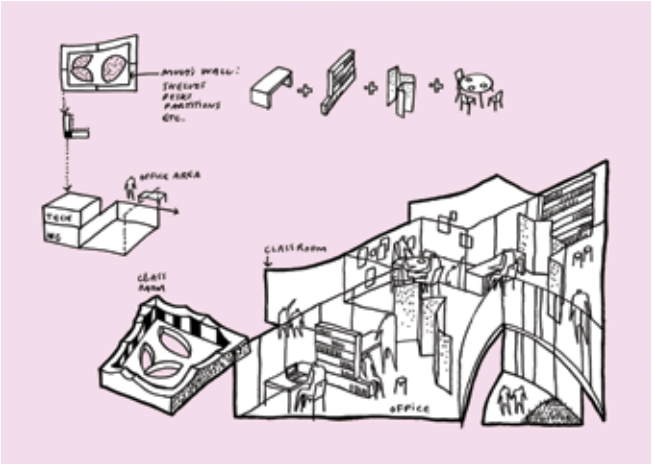
Update from around the region



Artist impression of a classroom at the Salama bint Hamdan Al Nahyan Center of Excellence in Early Childhood Development

Reem Island, Abu Dhabi to get new childhood centre of excellence

The Salama bint Hamdan Al Nahyan Foundation has announced the establishment of The Salama bint Hamdan Al Nahyan Center of Excellence in Early Childhood Development at Reem Island in Abu Dhabi aimed at facilitating further research and learning on Early Childhood Development (ECD).

A crucial component of the foundation's Early Childhood Development (ECD) programme for the UAE, the model early childhood education centre will have a capacity for around 80 children of up to three years of age, as well as a kindergarten centre for children from 4 to 5 years of age. There will be an auditorium that can accommodate up to 150 guests, a Parents Resource Center, and a retail store selling organic foods, developmentally appropriate toys and materials for young children and families.

The Centre of Excellence will be a new research-based facility that serves as a hub for early diagnosis and detection of learning challenges. It will likewise be open to university students who focus on ECD or related fields to conduct observations to aid their research. Moreover, the centre will host seminars, workshops and discussions to equip parents, educators and professionals to develop necessary skills and knowledge in ECD practices and policies.

The Early Childhood Centre of Excellence will create awareness among the UAE citizens about quality ECD learning programs and also serve as a model lab for other centres. As cognitive, physical, behavioural and learning development are largely defined as 0-3 years of age, early childhood development is a crucial period in the human development cycle and is the determining factor for social and emotional stability throughout an individual's life.

Further, the Foundation's ECD program aims to develop and nurture a team of well-trained professionals. As a result, it has established the Shamsa bint Mohammed Al Nahyan Fellowship in Early Childhood Development, in collaboration with Yale University. Currently enrolled in the fellowship is a pool of eight women, of whom seven are Emirati, who are either educators or paediatricians.

While revealing the vision on the fellowship program at the Muntada, Dr Salvatore LaSpada, Executive Director, Salama bint Hamdan Al Nahyan Foundation commented, "For the benefit of our children and the society as a whole, our fellows will be supported in the development of their projects and work with experts in ECD. The centre will be a base for the fellows to learn, share, and disseminate their knowledge to other professionals and educators, as well as parents. Our aspiration is to invest in the capacity of ECD leaders within the country who can take ECD forward."

Dr Walter Gilliam, Associate Professor of Child Psychiatry and Psychology and Director of The Edward Zigler Center in Child Development and Social Policy at the Yale University Child Study Center, commented: "In collaboration with the Foundation, we have incorporated a Long Distance Centre within the centre of excellence whereby the fellows and staff will be able to connect with Yale University. For training purposes, there will also be cameras in the classrooms whereby the teachers can be connected with Yale while they are interacting with the children."

The Centre of Excellence was formally launched on 6 October at a Muntada forum that included talks by Dr Salvatore LaSpada; Fatima Al Bastaki, Senior Advisor, Shamsa bint Mohamed Al Nahyan Fellowship in Early Childhood Development, Abu Dhabi; and Dr Walter Gilliam, Associate Professor of Child Psychiatry and Psychology and Director of The Edward Zigler Center in Child Development and Social Policy at the Yale University Child Study Center.

Dubai makes expat health insurance mandatory

Dubai's ruler has approved a law requiring all employers in the emirate to purchase health insurance for their expatriate staff, a move expected to boost healthcare spending by its 2.2 million residents considerably, *Arab News* reported.

The law will be rolled out within three years and will make employers responsible for providing at least an "essential benefits package" for every worker. It will be rolled out in several phases by 2016, the Dubai Health Authority said in a statement.

The government will remain responsible for the coverage of local citizens, who are estimated to make up less than a fifth of the population. Insurance companies will need to secure a special permit from the Health Authority in order to issue policies.

According to official estimates, only 40-50% of Dubai's residents are covered by government and private health insurance schemes currently.

Although it is unclear how much the required insurance policy will cost, Dubai-based Arqaam Capital estimates patient claims in Dubai will more than triple by 2016 to AED4.8 billion (US$1.3 billion) from AED1.3 billion a year ago.

"We see a medium-term positive for NMC Health, Al-Noor Hospitals, and to a lesser degree insurance underwriters in Dubai," Arqaam Capital said, adding, however, that it was not changing its ratings for the companies' shares, which are "buy" for NMC

Health and "hold" for Al-Noor Hospitals.

Dubai's neighbour Abu Dhabi introduced mandatory health insurance in 2007, with patient claims quadrupling as a result.

Arqaam Capital said the move could also spur growth in hospital bed capacity: the UAE has 1.9 beds per 1 000 residents while the global average is 3.0 beds and for developed countries it is 5.5.

Saudi and Canada to work closer in healthcare

The Kingdom of Saudi Arabia and Canada plan to increase co-operation in the health sector over the next six months, according to the Saudi deputy health minister, Mohammed Hamzah Kosheim.

Kosheim said details of the plan were outlined during a meeting with Simon Kennedy, the Canadian deputy minister of international trade, and his accompanying delegation at his office in Riyadh. Thomas MacDonald, the Canadian ambassador, was also present during the discussions.

"Canada is a highly developed country in the health sector. We are happy to exchange expertise for the benefit of the two nations," Kosheim said.

Kennedy said his visit was a follow-up to the agreement signed between the two countries recently: "We discussed the details of some of the future projects that are to be undertaken by the two parties."

The agreement was signed recently by Peter van Loan, the Canadian minister for international trade, and Abdullah Al-Rabeeah, the Saudi health minister.

Loan said co-operation between the two countries goes back three decades. "The agreement will create new opportunities to enhance and increase co-operation in the health and medical fields and enable the kingdom to benefit from Canada, which is recognized as having one of the best health care systems in the world," he said.

According to Al-Rabeeah, the agreement would allow the two countries to share medical expertise and exchange physicians and healthcare professionals.

Kennedy said that some 4,000 Saudi doctors have graduated from various universities and medical colleges in Canada. "We currently have around 17,000 Saudi students studying at various colleges and universities in Canada," he added.

KSA buys more state-of-the-art ambulances

Health facilities across the Kingdom of Saudi Arabia are expected to receive 400 state-of-the-art ambulances within 11 months, the Ministry of Health announced recently.

A senior official from the ministry said that the purchase order for these ambulances has been approved by the Health Minister Dr Abdullah Al-Rabeeah at a cost of SR130 million (about US$34 million).

Mohammed Al-Sibeiri, head of the procurement department at the ministry, said the ministry has updated its ambulance fleet by 1,700 vehicles over the past five years, and that these ambulances are available 24 hours a day on toll-free number 937 from any part of the Kingdom. The ministry has been providing 300 vehicles each year for the past three years.

He added that the ambulances would be distributed among the 20 health regions spread throughout the country for emergency services.

Meanwhile, the Ministry of Health signed a Memorandum of Understanding (MoU) with GE Healthcare recently to train medical professionals within the ministry. The accord will address current healthcare challenges in the area of training and clinical expertise and focus on transforming healthcare delivery via collaborations, partnerships and regional support from public and private sectors.

According to the agreement, some 600 technologists from the Ministry of Health would be trained in the fields of Magnetic Resonance (MR), Computed Tomography (CT) and X-ray. The ministry's professionals will also undergo clinical training and engage in leadership and decision-making programs. Attendees will exchange top-notch practices in modern medicine and hold learning sessions on change acceleration, in addition to shedding light on six sigma methodologies and processes.

Al-Rabeeah said that the government is keen on developing its human resources to provide better healthcare services to its people as per the ninth development plan.

"We have adopted an integrated and comprehensive system for healthcare and will increase the development potential of research and education in the Kingdom," the minister said, adding that the new training institute to be set up at the King Fahd Medical City, would be a major breakthrough for building new skills among the ministry's medical staff.

Doha to host world paediatric congress

Sidra Medical and Research Center and the Pan Arab Association of Pediatric Surgeons (PAAPS) have been chosen to co-host the 6th World Congress of the World Federation of Associations of Paediatric Surgeons (WOFAPS) in 2019, to take place at the National Convention Center in Doha, Qatar.

It is the first time in its 40-year history that WOFAPS will be hosted in the Middle East North Africa (MENA) region. Doha was chosen over Kuala Lumpur, Istanbul and Sydney.

"The selection of Doha as the host city for WOFAPS 2019 continues the organization's focus on improving the surgical care of children in emerging and developing countries. The region, and Qatar specifically, have invested heavily in building world-class medical institutions and developing innovative infrastructure, making a visit to Doha an exceptional experience from colleagues from across the world," said WOFAPS President Dr Richard Azizkhan.

Co-chairs of the regional organizing committee, Sidra's Clinical Chief of Surgery Dr David Sigalet and Hamad Medical Corporation's Head of Paediatric Surgery Dr Mansour Ali, were in Berlin at this year's WOFAPS conference when the bid was announced.

Dr Sigalet, who also serves as president elect of WOFAPS and will take over as president in 2017, said: "Qatar sits at the intersection of a growing, youthful population dedicated to learning and improving lives, which makes Doha, Sidra and our regional partners ideal hosts for a WOFAPS conference. Over 1,000 paediatric surgeons from all over the world will contribute to

learning opportunities for the attendees by taking part in training sessions and panel discussions, expanding the regional knowledge bank through access to international expertise, as well as the latest techniques and technologies."

The MENA region has a young and expanding population and consequently a growing need for paediatric surgical care and expertise. Sidra and its partners are committed to support education for these physicians and will sponsor 100 surgeons from low- and middle-income countries to attend WOFAPS 2019, who would not otherwise have had the opportunity to attend to take part.

Sidra Medical and Research Center, currently under construction in Doha, Qatar, will be a fully digital facility with advanced information technology applications, providing world-class care for women and children regionally and globally. Sidra will initially have 400 beds with infrastructure to enable expansion to 550 beds. Sidra represents the vision of Her Highness Sheikha Moza bint Nasser who serves as its Chairperson, and will be funded by a US$7.9 billion endowment from Qatar Foundation, one of the largest of its kind in the world.

Sidra staff and the medical and research center will also play a major role in making WOFAPS 2019 a key educational event for the region by holding instructional courses in conjunction with the congress through the use of its simulation center and access to the latest surgical technology.

The theme of the 2019 conference will be "Arabian Pearls of Paediatric Surgery," and a number of high-profile speakers from North America and Western Europe have already agreed to take part in the event, including Chief of Pediatric Surgery at the Rocky Mountain Hospital for Children Dr Steven Rothenberg; European Paediatric Surgeons' Association President Dr Jean-Michel Guys; Senior Associate in Surgery, Surgical Director at Center for Advanced Intestinal Rehabilitation at the Boston Children's Hospital Dr Tom Jaksic; Assistant Professor in Surgery at the Northwestern University Feinberg School of Medicine Dr Katherine Barsness; Director of the Colorectal Center at the Cincinnati Children's Hospital Dr Marc Levitt; Director of the Center for Prospective Clinical Trials at the Children's Mercy Kansas City Hospital Dr Shawn St. Peters.

DHA launches Smart Community

All screening results of health campaigns organized by the Dubai Health Authority (DHA) will be entered electronically using the new 'Smart Community Health Service,' said a top DHA official recently.

Dr Ahmad bin Kalban, CEO of Primary Healthcare at the DHA, said the new system would provide a boost to community health campaigns and help to analyze vital data.

"The community health section at the DHA carries out more than 200 health campaigns annually, targeting different sections of society. We provide free screening services for blood pressure sugar, cholesterol, etc. during these campaigns."

"Previously all this data was entered manually and analysis was a labour-intensive and time-consuming process. With this system, all the data will be entered and analyzed electronically, which improves efficiencies, minimizes errors and is in line with our smart e-health initiatives."

Dr Hanan Obaid, Head of Community Health Services, Primary Healthcare Sector at the DHA, said the system would help revolutionise the manner in which surveys are conducted at the DHA. "With the implementation of this system, we tailor-make our screening questionnaires electronically depending on the target audience. Respondents need to register themselves using an Emirates ID, drivers' licence or any other official form of identification."

"Once they electronically register themselves, their details are captured onto our system and doctors electronically fill out all the information including blood sugar levels etc. on their smartphones. The results can then be seen electronically by the family physician and respondents are provided with free counselling. Respondents can later log on to the DHA website and view their results as well as health education materials online at any point in time."

"The paperless process speeds things up for both patients and healthcare professionals," explained Obaid.

Mafraq Hospital launches breast-feeding program

In celebration of the UAE's National Breastfeeding Week held from 10-14 November, Mafraq Hospital has committed to enhanced levels of support for breastfeeding mothers and to implementing the WHO/UNICEF Baby-Friendly Hospital Initiative's '10 Steps to Successful Breastfeeding'.

One of the largest tertiary referral treatment hospitals in the United Arab Emirates, Mafraq Hospital, which opened in 1982, has 451 licensed beds, and is owned and operated by the Abu Dhabi Health Services Company PJSC (SEHA).

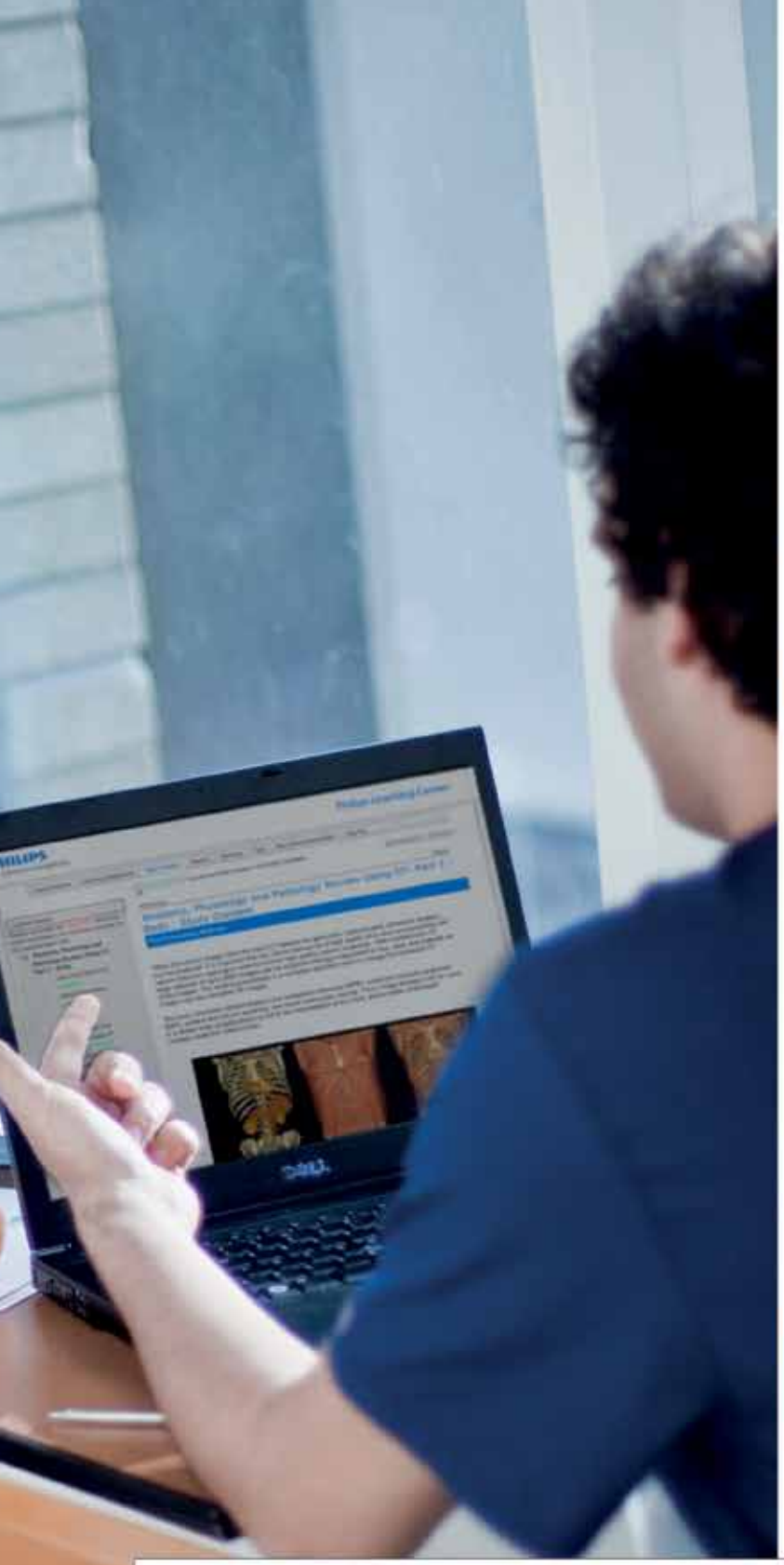
The hospital is fully committed to Emiratization and has developed a comprehensive plan to attract more Emirati talent. It has been recognized twice by the Sheikh Khalifa Excellence Awards for outstanding efforts in improving medical standards, providing exceptional patient care and its adherence to business best practice.

Based on the premise that breastfeeding and mother-baby bonding contribute to healthy growth and development of babies, the Baby-Friendly Initiative launched by the World Health Organization (WHO) and the United Nations Children's Fund (UNICEF) in 1991 recommends breastfeeding exclusively for the first six months of a baby's life to optimize these benefits. Thereafter, mothers can continue to breastfeed for two years or more, as is mutually desired by mother and baby, and to complement this with solid foods such as mashed fruits and vegetables.

Babies who are not breastfed are at increased risk of infant morbidity and mortality, adult obesity, diabetes, cardiovascular disease and osteoporosis, and breastfed babies and their mothers have less risk of pre-menopausal breast cancer and ovarian cancer. For mothers, breastfeeding also helps lower the risk of breast and ovarian cancer, uses up to 500 calories a day, is cost-efficient and can help build a stronger bond between mother and baby.

Themed "Breastfeeding Support: Close to Mothers", the UAE's National Breastfeeding Week campaign focused on the support needed to enable new mothers to initiate, establish and maintain proper breastfeeding practices.

Dr Laila Obaid, Pediatrics Neonatol-



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PHILIPS

ogy Consultant at Mafraq Hospital said, "Breastfeeding success begins in the hospital. At Mafraq Hospital, we are committed to adopting maternity practices that are supportive of breastfeeding. We are also strong advocates of the social support required to increase a mother's confidence in her ability to breastfeed beyond the early weeks and months. Therefore, we believe that the key to the best breastfeeding practices is continued day-to-day support for the nursing mother within her home and community."

As part of the week-long awareness campaign, invited members of the La Leche League (LLL), a UAE-based non-profit organization, provided breastfeeding counselling and encouraged new mothers through a series of interactive activities. A special booth was set up at Mafraq Hospital to hand out informative brochures to visitors and give away prizes to nursing mothers who have been breastfeeding their babies for two years or more. The team also counselled mothers at the Bawabat Al Sharq mall.

Mafraq Hospital's trained lactation consultants offer support to breastfeeding mothers from the moment of birth until after moms and babies have left the hospital to go home.

The Baby-Friendly designation is awarded after a rigorous on-site survey is completed, and maintained by continuing to practice 10 crucial program elements. The comprehensive program includes initiating breastfeeding in the first hour of life, "rooming-in" with mums and babies in the same room, educating staff and patients, and fostering breastfeeding support groups.

"We have a powerful and experienced team at the hospital coming together to re-write policies and procedures, undergo considerable training, extend skills to all levels of staff, and establish auditing to ensure that quality is maintained," added Obaid.

Meanwhile, SEHA announced that in order to service the growing regional community, it is investing US$750 million to build a new Mafraq Hospital campus which is due to open in 2015. The new facility will serve as the community hospital for one of the fastest growing areas in the Emirate of Abu Dhabi, whilst continuing to align its goals with those of the Executive Council and Abu Dhabi Vision 2030.

Moorfields Eye Hospital Dubai invests in advanced eye laser technology

Moorfields Eye Hospital Dubai, the first overseas branch of the world renowned Moorfields Eye Hospital in London, has invested in the most advanced technology used for laser refractive surgery for vision correction, providing improved performance for patients in terms of speed, precision, safety and comfort, and often allowing faster visual recovery. Patients can also benefit from a special offer on vision correction surgery until the end of the year.

The Schwind Amaris 750S uses an exceptionally small diameter laser beam with a customised ablation map, which matches the shape of the patient's cornea. The resulting vision for the patient can be an improvement on pre-treatment eyesight with glasses or contact lenses. Moorfields, in Dubai, is among the first private hospitals in the Middle East to invest in the new technology.

The Schwind Amaris 750S is the leading technology for laser treatment and operates with a very fast repetition rate: 750 tiny light flashes per second shape the corneal surface quickly resulting in patient comfort and better vision correction, correcting one dioptre (a measure of the optical power of a lens) of myopia within 1.5 seconds, and eight dioptres are removed within 13 seconds.

Dr Edmondo Borasio, Consultant Corneal and Refractive Surgeon at Moorfields Eye Hospital Dubai, said: "Patients should only have this eye correction treatment done once and so they want to have the safest and most effective treatment. The Amaris 750S really is the state of the art in laser vision correction – very fast and accurate, whilst providing information of the cornea on screen in real time. It is especially valuable for patients who have complications from other eye diseases and for those who have a complication following previous surgery. Moorfields is a referral centre for the management of complications following previous refractive surgery. The new technology, which is very compact and patient friendly, is already operational and the patient results have been very good."

Clinical studies have documented the treatment quality achieved with the Schwind Amaris technology, with visual acuity of 10/10 (100 percent) or better achieved in nearly all cases. This means that a high percentage of treated patients could see even better than before treatment with their glasses or contact lenses. The study also shows that patients had improved contrast vision.

The Schwind Amaris 750S has two energy levels, a high energy level rapidly removes around 80 percent of the tissue to be removed and then a gentler beam removes the remaining 20 percent, creating the smooth surface required for improved vision. Since the patient's eyes can involuntarily move for milliseconds while fixating on the laser light, the Schwind Amaris 750S compensates for this with its advanced 6 dimensions eye tracker that monitors the position of the eye with approximately 1050 measurements per second and detects all these eye movements and compensates for them, instantly.

Dubai doctor develops new method to reconstruct abdominal wall

Dr Marwan Al Zarouni, head of plastic surgery and wound care at Rashid Hospital, Dubai, announced recently that his novel two-step technique (TST) to reconstruct the abdominal wall had been published by the *International Wound Journal* on March 15, 2013.

He said the procedure is used to manage complex abdominal wall defects that occur due to trauma, multiple re-operations, hernia, abdominal compartment syndrome, obesity and other problems.

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He said he had successfully operated on 50 patients using the technique and its novelty lay in ensuring a quick, hassle-free and lasting recovery, unlike an earlier three-stage process where patients come back for repair.

The TST uses the same vacuum-assisted or non-invasive wound closure system to promote healing as the earlier procedure, but there's a difference when covering the exposed intestine.

"Unlike the earlier procedure which used a skin graft to temporarily cover the bowel, I flipped over the skin surrounding the bowel to create the missing abdominal wall. I stitched the flipped skin from either side to ensure the bowel remains firmly inside," explained Al Zarouni. "With the skin grafts used earlier, the intestine would bulge out and there would be pressure on the patient when he walked or moved, often requiring protection with a binder. The patient would also have to come back in six months or so for another repair procedure. Now that will no longer be required."

Al Zarouni said the first trigger for the technique occurred when a complicated trauma case involving a labourer was referred to him in 2008. "I realised that this man would not come back to me for follow-up in six months' time as his company would probably send him back to his home country."

Necessity being the mother of invention, he invented the TST which puts patients back on their feet in five weeks. While the first two steps are performed over a period of three weeks, an additional two weeks are required for follow-up as an outpatient.

Yale to mentor UAE fellows on early childhood development

The Shamsa bint Mohamed Al Nahyan fellowship, a crucial component of the Salama bint Hamdan Al Nahyan Foundation's holistic Early Childhood Development (ECD) program, has selected eight of its fellows to train at Yale University's Edward Zigler Center, which trains future generations of professionals whose work influences both child development research and policy formation.

Seven Emirati professionals and one UAE resident and professional were chosen by the Foundation and Yale University to learn more about ECD. The Fellowship is a one-year program for young professionals with the central aim of building the capacity of the UAE workforce by training a select group of promising early and mid-career leaders to practise ECD in order to improve early childhood services and support in the UAE.

"The strategic partnership between the Foundation and Yale University will increase the skill-set of our Fellows, and therefore contribute to the larger ECD community in the country," said Sheikha Shamsa bint Mohammed Al Nahyan, leader and founder of the fellowship program. "While Yale University will provide international expertise to our Fellows, the Foundation will support them in implementing the ideas they develop during the Fellowship and over the long term support the leadership roles they will play in this important field."

Having spent a week in October working with Yale in Abu Dhabi, the first group of the UAE-based Fellows will set off for the Zero to Three National Conference (*www.zerotothree.org*), the world's largest professional conference devoted solely to child development in the first three years, on 10 December 2013. This will be followed by a trip to Yale University in New Haven, Connecticut. They were expected to return by 20 December.

During the trip, the Fellows will meet with the Yale faculty who are specialists in issues related to young children and their assigned mentors. The Fellowship also allows for visits to community-based early childhood education centres and health facilities.

"We are excited to host the first group of the Shamsa bint Mohamed Al Nahyan Fellows in ECD. The commitment and engagement of the Fellows in the program so far has been exceptional, and we are confident that their participation at the national conference on ECD at San Antonio along with their visit to Yale University will enrich their knowledge and allow for further discussions on the importance of ECD on a global level", said Dr Walter Gilliam, Director of The Edward Zigler Center in Child Development and Social Policy at the Yale University Child Study Center.

The Foundation's role is to increase awareness and raise the ECD discussion levels in Abu Dhabi, UAE and the region in general. The family foundation, founded by Sheikha Salama Bint Hamdan Al Nahyan in 2010, will work closely with UAE experts such as Karima Al Mazrouie, Curriculum Division Manager P-12 at ADEC; Dr. Hossam Al Tatari, Division Chief PEDS-Infectious Disease at Tawam Hospital; and Fatima Al Bastaki, Director of Early Childhood Learning Center at Zayed University as Senior Advisers of the Shamsa bint Mohammed Al Nahyan Fellowship in Early Childhood Development.

Since the inception of the program in October, the Fellows have been encouraged to work on projects that have positive and meaningful effects on the community. The end of the fellowship year is May 2014.

The next group of Fellows is expected to recommence in October 2014 with the same vigorous selection process entailing nominations, applications, and interviews conducted by the Foundation and Yale University. MEH

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Update from around the globe

EU launches universal flu vaccine research project

A newly launched European project is set to take a major step towards the development of a universal flu vaccine. It aims to counter the emergence of new strains and seasonal epidemics.

The viral infection usually strikes in colder months with seasonal influenza being responsible for around 3 - 5 million cases of severe illness and 250,000 to 500,000 deaths worldwide.

Due to its rapid spread, particularly among high-risk population groups, influenza remains a serious public health problem. To date, the most effective way to prevent the disease or severe symptoms is annual vaccination, but current vaccines only offer limited protection against evolving strains of the infection.

To overcome these weaknesses, a public-private partnership comprising seven renowned organisations from Europe joined forces under the EDUFLUVAC project to develop a broad-spectrum, long-lasting vaccine. EDUFLUVAC aims to take a novel approach by 'educating' the immune system to cross-recognise common regions within multiple influenza virus strains.

"Developing a universal flu vaccine has become a global health priority for preventing the spread of the virus and the emergence of new strains, and we are convinced that EDUFLUVAC will be a major step towards achieving this goal," says Othmar Engelhardt, principal investigator at the National Institute for Biological Standards and Control, United Kingdom.

The research team expects to achieve better protection against epidemic influenza through the development of a vaccine that would not only offer the advantage of eliminating the need for a seasonal vaccine every year, but could also reduce the need for costly annual vaccination campaigns.

Odile Leroy, Executive Director of the European Vaccine Initiative and co-ordinator of EDUFLUVAC, says: "Low and middle-income countries currently have minimal influenza vaccination programmes. Thus, the development of a vaccine that elicits broad long-lasting defence would facilitate vaccination campaigns and confer protection against influenza in hitherto untargeted groups with limited health care."

The four-year project is co-ordinated by the European Vaccine Initiative headquartered in Germany and was awarded a grant of EUR 4.6 million in EU funding.

Pneumonia – the single biggest cause of child mortality

Pneumonia remains the single biggest killer of children under five globally, claiming the lives of more than one million children every year.

To celebrate World Pneumonia Day on 12 November, the GAVI Alliance, UNICEF and the World Health Organization (WHO) launched an "Innovate to End Child Pneumonia" campaign to highlight essential actions to help end child deaths from this entirely preventable disease.

"Tackling pneumonia doesn't necessarily need complicated solutions," said Dr Mickey Chopra, Chief of Health, UNICEF, proposing five simple but effective interventions, which will help reduce the burden of the disease that is responsible for almost one-fifth of all child deaths around the world, if implemented properly.

These are:

- Exclusive breastfeeding for six months and continued breastfeeding complemented by nutritious solid foods up to age 2;
- Vaccination against whooping cough (pertussis), measles, Haemophilus influenzae type b (Hib) and pneumococcus;
- Safe drinking water, sanitation and handwashing facilities; Improved cooking stoves to reduce indoor air pollution;
- Treatment, including amoxicillin dispersible tablets and oxygen;

Recognizing that child mortality cannot be addressed in a vacuum, but only through integrated efforts, in April 2013, WHO and UNICEF released an Integrated Global Action Plan for the Prevention and Control of Pneumonia and Diarrhoea (GAPPD).

The GAPPD presents an innovative framework bringing together prevention, protection and control of both pneumonia and diarrhoea – two of the world's leading killers of children under 5 – to make more efficient and effective use of scarce health resources.

To mark 5th World Pneumonia Day, Mauritania and Papua New Guinea introduced the pneumococcal vaccine, which protects against one of the leading causes of pneumonia. With support from the GAVI Alliance, more than 50 countries will introduce this vaccine by 2015.

"The GAVI Alliance is helping to accelerate the fight against pneumonia by increasing access to pneumococcal vaccines, thanks to GAVI's innovative Advance Market Commitment (AMC), but also to the five-in-one pentavalent vaccine which protects against *Haemophilus influenzae* type b, another major cause of pneumonia," says Dr Seth Berkley, CEO of the GAVI Alliance.

Since the launch of the GAPPD seven months ago, several countries have taken this forward. For example, Bangladesh and Zambia are translating the GAPPD into local implementation plans in some districts. Program managers responsible for immunisation, child health, nutrition and water and sanitation have joined forces to accelerate progress and eliminate preventable deaths from pneumonia and diarrhoea.

In addition, in October 2013, the WHO-updated guidelines on the treatment of pneumonia, recommending simpler antibiotic regimens, and published a handbook on how to introduce the pneumococcal vaccine for staff, in line with the GAPPD.

"To achieve the vision and goals of the integrated plan – to end preventable deaths from pneumonia and diarrhoea in the next generation – the children of the world need to see political will, co-ordinated efforts, and increased resources at the global and national levels to fight these stubborn killers," says Dr Elizabeth Mason, Director of WHO's Department of Maternal, Newborn, Child and Adolescent Health.

Cancer tumour analysis to be digitized

Philips has announced that it is collaborating with Institut Curie, in order to digitize tumour analysis research, with the aim of speeding up and improving cancer diagnosis and treatment.

While pathologists today view tissue sample images manually using a microscope, by using Philips Digital Pathology Solution, Institut Curie hopes to increase workflow efficiency and consolidate its pathology activities at multiple sites into one single virtual laboratory.

In addition to the diagnosis of tissue from patients with cancer indications, the pathology department at Institut Curie evaluates thousands of test samples from experimental cancer research programmes worldwide to gain a better understanding of the causes and mechanisms of diseases at both cellular and molecular level. These new insights may give rise to new diagnostic approaches and therapeutic treatments.

Currently, Institut Curie produces and diagnoses more than 200,000 glass pathology slides every year using a microscope. Digitization of the pathology workflow could ease this logistical burden and enable new ways of working, such as real-time collaboration with peers and creation of a virtual network across the globe. Moreover, in cancer research, digital histopathology information can now, for example, be added to biology data and this opens up new ways to mine information from tumour tissue for further data analysis.

"Digitization of pathology will enable us to keep momentum going to accelerate cancer research and, in the end, improve patient care," says Xavier Sastre-Garau, director of the Biopathology Department of Institut Curie.

"Philips' digital pathology solution is empowering Institut Curie to realize a single virtual laboratory that offers new opportunities for intensive collaboration," says Guido du Pree, vice-president of Marketing & Sales for Philips Digital Pathology Solutions.

To support its cancer research, Insitut Curie has completed installation of the fully integrated Philips Digital Pathology Solution with ultra-fast scanners at its locations in Paris and St. Cloud, which are connected on-line through an image management system that provides an interface to communicate with commercially available Laboratory Information Systems (LIS).

Developing world faces breast cancer surge

Rising breast cancer incidence and mortality represent a significant and growing threat for the developing world, according to a new global study commissioned by GE Healthcare.

Report co-author Bengt Jönsson, Professor in Health Economics at the Stockholm School of Economics, explained: "Breast cancer is on the rise across developing nations, mainly due to the increase in life expectancy and lifestyle changes such as women having fewer children, as well as hormonal intervention such as post-menopausal hormonal therapy. In these regions, mortality rates are compounded by the later stage at which the disease is diagnosed, as well as limited access to treatment, presenting a 'ticking time bomb' which health systems and policymakers in these countries need to work hard to defuse."

The report on "the prevention, early detection and economic burden of breast cancer" suggests that consumer understanding about breast cancer and screening methods is putting lives at risk in the developing world. For example, a recent survey in Mexico City indicated many women feel uncomfortable or worried about having a mammogram.

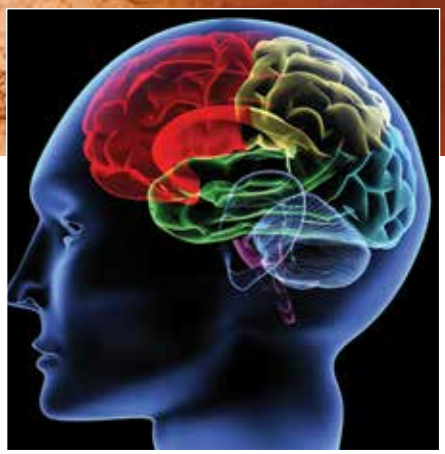
"It is of great concern that women in newly industrialized countries are reluctant to get checked out until it is too late. This is why GE is working with a number of governments and health ministries in these regions to expand access to screening and improve consumer awareness. Some of these initiatives are making excellent progress," said Claire Goodliffe, Global Oncology Director for GE Healthcare.

The study draws some interesting conclusions about the impact of breast cancer on sufferers' lives. According to the most recent published data, 15 million years of 'healthy life' were lost worldwide in 2008 due to women dying early or being ill with the disease. 'Healthy life lost' is defined by years lost due to premature death and incapacitation due to the effects of breast cancer. Women in Africa, China and the USA lost the most years of healthy life. Furthermore, of the 15 million years lost globally, more than three times as many years were lost due to dying than being ill with the disease. For women in Africa, Russia, Mexico, Turkey and Saudi Arabia, the number of healthy years lost due to death were up to seven times greater than elsewhere in the world.

Jönsson said: "The report findings suggest that a worryingly high proportion of women are still dying from breast cancer across the world and this seems to correlate strongly with access to breast screening programmes and expenditure on healthcare."

He highlighted the distinct lack of accurate and current data in areas like breast cancer incidence and mortality, the economic burden of the disease, and detailed patient-linked data on outcomes in relation to treatment patterns and stage of diagnosis. "This limits analyses of how changes in clinical practice affect patient outcomes and needs to be addressed," he said.

As breast cancer incidence rates have steadily increased in developed countries over the last 50 years, it is no surprise that the main focus of treatment has been survival. However, as more women are now living with the disease, the report suggests that quality of life is becoming a growing issue as



survival rates improve. As a result, doctors are urged to focus on measuring the impact of diagnosis and treatment on survivors' quality of life to identify what problems patients may have and how these can be mitigated.

Goodliffe said: "This report finds a direct link between survival rates in countries and the stage at which breast cancer is diagnosed. It provides further evidence of the need for early detection and treatment which we welcome, given current controversies about the relative harms, benefits and cost-effectiveness of breast cancer screening."

EU funds new research for strategies to prevent neurodegenerative diseases

The EU Joint Programme - Neurodegenerative Disease Research (JPND) - is launching two calls for proposals aimed at encouraging research teams across Europe to investigate the cross-disease pathways in neurodegenerative diseases such as Alzheimer's and Parkinson's, and to identify new, innovative preventative strategies for these debilitating conditions.

"Neurodegenerative Diseases such as Alzheimer's and Parkinson's are a global health, economic and social emergency with numbers affected expected to double by 2030 and more than triple by 2050," according to Professor Philippe Amouyel, Chair of the JPND Management Board. "With this in mind, JPND-participating countries have identified two further areas of greatest need for targeted investment in order to improve understanding of the underlying links between different diseases, and to encourage new ideas on preventative strategies."

Professor Amouyel added: "This investment is part of a series of JPND funding initiatives, aimed at addressing priority areas identified in our European Research Strategy. This year's calls will see over 23 million euro made available to applicants from 18 different countries."

According to Professor Thomas Gasser, University of Tübingen and Chair of the JPND Scientific Advisory Board, "Neurodegenerative diseases currently cannot be cured, prevented, or even substantially slowed. In order to tackle these diseases together, we need greater thinking across traditional clinical boundaries and new, innovative ideas aimed at preventing disease development and progression in healthy, at-risk and early-stage populations. These calls aim to harness the necessary expertise across Europe and globally to address these needs in the fight against these diseases."

The following neurodegenerative diseases are included for both calls:

- Alzheimer's disease and other dementias
- Parkinson's disease and PD-related disorders
- Prion disease
- Motor neurone diseases
- Huntington's disease
- Spinocerebellar ataxia (SCA)
- Spinal muscular atrophy (SMA)

New HIV strain leads to faster AIDS development

A recently discovered HIV strain leads to significantly faster development of AIDS than currently prevalent forms, according to new research from Lund University in Sweden.

The period from infection to the development of AIDS was the shortest reported among HIV-1 types, at around five years.

There are over 60 different epidemic strains of HIV-1 in the world, and geographic regions are often dominated by one or two of these. If a person becomes infected with two different strains, they can fuse and a recombined form can occur.

"Recombinants seem to be more vigorous and more aggressive than the strains from which they developed", explained Angelica Palm, a doctoral student at Lund University.

The recombinant studied is called A3/02 and is a cross between the two most common strains in Guinea-Bissau, West Africa - 02AG and A3. It has previously been described by Joakim Esbjörnsson, a post-doctoral fellow at the University of Oxford, who is a co-author of the study.

So far, the new strain has only been identified in West Africa, but other studies have shown that the global spread of different recombinants is increasing. In countries and regions with high levels of immigration, such as the US and Europe, the trend is towards an increasingly mixed and complex HIV flora, unlike in the beginning of the epidemic when a small number of non-recombinant variants of the virus dominated. There is, therefore, reason to be wary of HIV recombinants in general.

"HIV is an extremely dynamic and variable virus. New subtypes and recombinant forms of HIV-1 have been introduced to our part of the world, and it is highly likely that there are a large number of circulating recombinants of which we know little or nothing. We therefore need to be aware of how the HIV-1 epidemic changes over time", said Patrik Medstrand, Professor of Clinical Virology at Lund University.

The research is based on a unique long-term follow-up of HIV-infected individuals in Guinea-Bissau, a project run by Lund University. In future research, Angelica Palm and her colleagues hope to be able to continue researching the characteristics of recombinant viruses and the presence of these among HIV carriers in Europe.

For health services, the new research results mean a need to be aware that certain HIV-1 types can be more aggressive than others, according to the research team.

Frost & Sullivan issues predictions for global healthcare market

Frost & Sullivan has released its three big predictions for the global healthcare market for 2014 and beyond: mHealth, Cloud in Healthcare and Regulatory Environments.

"Insights from a '2013 Search for Growth' survey which involved 1835 executives in more than 40 countries worldwide has also been essential in unveiling the business outlook for Pharmaceuticals, Biotechnology, Clinical Diagnostics and Medical Devices, as well as to provide a global perspective on the industry's geographical hot spots," explains Frost & Sullivan Partner, Dorman Followwill.

mHealth expansion has been fuelled by an unprecedented spread of mobile technologies, as well as advancements in their innovative application to address health priorities. It is largely supported by mobile phones, patient monitoring devices, personal digital

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assistants (PDAs) and other wireless devices.

The penetration prospects of mHealth technologies are significant in the following areas: wireless vital signs monitoring, location-aware telemonitoring systems and Bluetooth wireless technology-enabled health trackers. It is an exciting area of opportunity for healthcare growth and will provide innovative solutions for healthcare providers and patients alike, across the board.

In addition, as more healthcare IT and patient monitoring tools are integrated, every hospital facility will eventually have to acquire a full-enterprise wireless solution. The most innovative mobile healthcare solutions that best meet pressing healthcare needs will be adopted as the gold standard.

Enterprise-wide healthcare informatics will also improve the quality of medical services and efficiency of operations while reducing expenditure. Implementing cloud computing technologies appropriately will help healthcare providers improve the quality of medical services and the efficiency of operations, share information worldwide and manage budgets. The concept can be applied in a variety of ways, including data storage and data loss prevention, maintaining patient information records and authorized sharing of information.

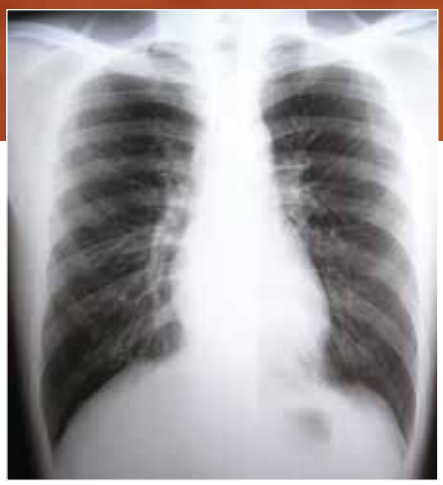
As for Regulatory Environment, recent healthcare reforms and policy initiatives in many countries have emphasised the importance of quality of care over quantity. In the absence of sufficient proof of clinical benefit, reimbursements may pose a major hurdle.

Overall, three big predictions may be formulated based on the survey's results:

– As healthcare is geared towards a personalized medicine model, companion diagnostics will alter drug development and the commercialization process of drug candidates. Combining biomarkers and drugs will make for safer, more efficient therapy.

– The healthcare and life sciences industry will consolidate further in this decade, with many big pharma companies seeking alternatives to the blockbuster model.

– The rise of new technologies capable of integrating medical devices into a connected platform will improve function of devices, reduce the manpower burden and minimize errors.



World lung organisations call for better lung health policies

Experts from the world's leading lung organizations have come together for the first time to call for a worldwide effort to improve healthcare policies and systems to make a positive difference for the lung health of the world.

Produced by the Forum of International Respiratory Societies (FIRS), the report was launched on 20 November, COPD (Chronic Obstructive Lung Disease) Day. Entitled *Respiratory Diseases in the World: Realities of Today – Opportunities for Tomorrow*, the report features five major disease areas that are of immediate and greatest concern, including COPD, which is the fourth-leading cause of death worldwide.

"This report aims to heighten awareness of lung disease throughout the world. We hope that this collaboration will help to shed light on the pervasiveness of these conditions and diseases and will be a call to action for health-care professionals, policy makers, patients, and advocates," said Michael H. Baumann, MD, MS, FCCP, President, American College of Chest Physicians.

Some of the key issues highlighted in this publication include the following:

- COPD affects more than 200 million people and is the fourth-leading cause of death in the world.
- Asthma affects about 235 million people worldwide, is one of the most frequent reasons for hospital admissions among children, and leads to approximately 180 000 deaths each year.
- Respiratory infections account for over 4 million deaths annually, disproportionately in children, and are the leading cause of death in low-income or middle-income countries.
- TB kills around 1.4 million people with about 8.7 million new cases of TB annually.
- Lung cancer is the most commonly diagnosed cancer in the world, accounting for 13% of the total reported cancers and affecting over 1.6 million people annually.

Tapping into spinal cord injury

As many as 500,000 people suffer a spinal cord injury each year, and are two to five times more likely to die prematurely, with worse survival rates in low- and middle-income countries, according to the WHO.

A new WHO report, *International Perspectives on Spinal Cord Injuries*, summarizes the best available evidence on the causes, prevention, care and lived experience of people with spinal cord injury.

Males are most at risk of spinal cord injury between the ages of 20-29 years and 70 years and older, while females are most at risk between the ages of 15-19 years and 60 years and older. Studies report male to female ratios of at least 2:1 among adults.

Up to 90% of spinal cord injury cases are due to traumatic causes like road traffic crashes, falls and violence. Variations exist across regions. For example, road traffic crashes are the main contributor to spinal cord injury in the African Region (nearly 70% of cases) and the Western Pacific Region (55% of cases) and falls the leading cause in the South-East Asia and Eastern Mediterranean Regions (40% of cases). Non-traumatic spinal cord injury results from conditions such as tumours, spina bifida, and tuberculosis. A third of non-traumatic spinal cord injury is linked to tuberculosis in sub-Saharan Africa.

Most people with spinal cord injury experience chronic pain, and an estimated 20-30% show clinically significant signs of depression. People with spinal cord injury also risk developing secondary conditions that can be debilitating and even life-threatening, such as deep vein thrombosis, urinary tract infections, pressure ulcers and respiratory complications.

Spinal cord injury is associated with lower rates of school enrolment and economic participation. Children with spinal cord injury are less likely than their peers to start school, and once enrolled, less likely to advance. Adults with spinal cord injury face similar barriers to socio-economic participation, with a global unemployment rate of more than 60%. Spinal cord injury carries sub-

stantial individual and societal costs.

Many of the consequences associated with spinal cord injury do not result from the condition itself, but from inadequate medical care and rehabilitation services, and from barriers in the physical, social and policy environments that exclude people with spinal cord injury from participation. Full Implementation of the Convention on the Rights of Persons with Disabilities is urgently required to address these barriers.

"Spinal cord injury is a medically complex and life-disrupting condition," notes Dr Etienne Krug, Director of the Department of Violence and Injury Prevention and Disability, WHO. "However, spinal cord injury is preventable, survivable, and need not preclude good health and social inclusion."

Essential measures for improving the survival, health and participation of people with spinal cord injury include:

- Timely, appropriate pre-hospital management: quick recognition of suspected spinal cord injury, rapid evaluation and initiation of injury management, including immobilization of the spine.
- Acute care appropriate to the level and severity of injury, degree of instability and presence of neural compression.
- Access to ongoing health care, health education and products such as catheters to reduce risk of secondary conditions and improve quality of life.
- Access to skilled rehabilitation and mental health services to maximize functioning, independence, overall well-being and community integration.
- Access to appropriate assistive devices that can enable people to perform everyday activities, reducing functional limitations and dependency.
- Specialized knowledge and skills among providers of medical care and rehabilitation services.

Essential measures to secure the right to education and economic participation include legislation, policy and programmes that promote:

- Physically accessible homes, schools, workplaces, hospitals and transportation.
- Inclusive education.
- Elimination of discrimination in employment and educational settings.
- Vocational rehabilitation to optimize the chance of employment.
- Micro-finance and other forms of self-employment benefits to support alternative forms of economic self-sufficiency.
- Access to social support payments that do not act as disincentives to return to work.
- Correct understanding of spinal cord injury and positive attitudes towards people living with it.

on the WEB *International Perspectives on Spinal Cord Injuries*
www.who.int/disabilities/policies/spinal_cord_injury

New resource expands access to family planning

A new resource for health program managers and policy makers released recently aims to improve access to family planning for women after childbirth and during the first 12 months of motherhood.

Closely spaced and unintended pregnancies are a health risk to both mother and child: spacing pregnancies at least two years apart can avert 10% of infant deaths and about one out of five deaths in children aged 1 to 4.

Launched in Addis Ababa, the 'International Conference on Family Planning for Postpartum Family Planning Full Access, Full Choice' provides interventions at all levels of health care to expand access to scientifically-sound family planning methods for new mothers.

The plan identifies three critical areas of work for countries to ensure successful implementation of the strategies:

- Close tracking of post-partum contraceptive use to ensure a steady supply and distribution of contraceptives;
- High quality, easy-to-understand informational materials about family planning options to help women and families make informed choices; and
- Health worker training of recommended practices so services are consistent with global standards of care.

Programming Strategies is being launched by the World Health Organization (WHO), the US Agency for International Development (USAID) and its implementing partner, the Maternal and Child Health Integrated Program (MCHIP).

"Virtually all women who have just had a baby are not ready to have another one right away; but too often they don't have access to family planning," says Dr Marleen Temmerman, director of the Department of Reproductive Health and Research at WHO. "Many women are not even aware that they can become pregnant within 12 months of giving birth."

Demographic and Health Survey (DHS) data from 27 developing countries show that 95% of post-partum women want to avoid a pregnancy for at least two years, yet 65% do not use contraception. In Ethiopia, a similar analysis shows 81% of post-partum women are not using any contraception.

"There are many obvious, although often missed, opportunities to inform post-partum women on their options for healthy birth spacing and offer them an effective method of contraception," said Patricia MacDonald, Senior Technical Advisor, Office of Population and Reproductive Health, USAID. "Antenatal care givers, birth attendants, child health providers and vaccinators should all take the time to ask a woman whether she is interested in family planning to protect herself from having another pregnancy too soon. This critical window may be the only chance to offer post-partum women the information they need for safe and healthy motherhood."

"This document demonstrates the global health community's response to the growing demand for post-partum family planning," according to Koki Agarwal, MCHIP Director and moderator of the launch event. "Today we call on stakeholders across the spectrum – from health extension workers to midwives, nurses, medical doctors and policy makers – to ensure that every mother, every couple, is better able to safely plan their families."

on the WEB Programming Strategies for Postpartum Family Planning
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Medical research news from around the world

Mayo Clinic: Add bone deterioration to diabetes complications

The list of complications from Type 2 diabetes is long: vascular and heart disease, eye problems, nerve damage, kidney disease, hearing problems and Alzheimer's disease. Physicians have long thought of osteoporosis as another complication. Based on a Mayo Clinic study published in the *Journal of Bone and Mineral Research*, that's confirmed: You can definitely add skeletal problems to the list.

"This is the first demonstration – using direct measurement of bone strength in the body – of compromised bone material in patients with Type 2 diabetes," says Sundeep Khosla, M.D., Mayo Clinic endocrinologist and senior author of the study. "Clearly, the skeleton needs to be recognized as another important target of diabetes complications."

Previous studies in the field showed that patients with diabetes experienced fractures at levels of bone density above that of the regular population, hinting that something was different about the "quality" of their bone. The Mayo researchers validated that assumption in a clinical study of 60 postmenopausal women, 30 of whom had Type 2 diabetes. Using a new tool (OsteoProbe), the researchers performed micro indentation testing of the tibia (actually causing a microscopic crack) to measure bone material strength.

Compared to the control group of women, aged 50 to 80, the group with Type 2 diabetes had significantly lower bone material strength. There was no difference between the microarchitecture of the bone or bone density between the two groups. The study showed that diabetic women with lower bone material strength had also experienced higher levels of hypoglycaemia over the previous 10 years, suggesting potential detrimental effects of poor glucose control on bone quality.

The resounding message: Conventional measurements under-estimated the risk of fracture among patients with Type 2 diabetes and loss of bone material strength, or bone quality, is a clear, downstream consequence of the disease. The new technology may help in studying other conditions where fractures occur at higher than expected bone density, says co-author and rheumatologist Shreyasee Amin, M.D. She says this will be especially relevant to many forms of auto-immune arthritis where glucocorticoids are used, such as in rheumatoid arthritis.

The team says more research needs to be done, as this was a small study in a limited population.

Musical training influences brain anatomy and function

New findings show that extensive musical training affects the structure and function of different brain regions, how those regions communicate during the creation of music, and how the brain interprets and integrates sensory information. The findings were presented at Neuroscience 2013, the annual meeting of the Society for Neuroscience and the world's largest source of emerging news about brain science and health.

These insights suggest potential new roles for musical training including fostering plasticity in the brain, an alternative tool in education, and treating a range of learning disabilities.

The new findings show that:

- Long-term high level musical training has a broader impact than previously thought. Researchers found that musicians have an enhanced ability to integrate sensory information from hearing, touch, and sight.
- The age at which musical training begins affects brain anatomy as an adult; beginning training before the age of seven has the greatest impact.
- Brain circuits involved in musical improvisation are shaped by systematic training, leading to less reliance on working memory and more extensive connectivity within the brain.

Some of the brain changes that occur with musical training reflect the automation of task (much as one would recite a multiplication table) and the acquisition of highly specific sensorimotor and cognitive skills required for various aspects of musical expertise.

"Playing a musical instrument is a multi-sensory and motor experience that creates emotions and motions – from finger tapping to dancing – and engages pleasure and reward systems in the brain. It has the potential to change brain function and structure when done over a long period of time," said press conference moderator Gottfried Schlaug, MD, PhD, of Harvard Medical School/Beth Israel Deaconess Medical Center, an expert on music, neuro-imaging and brain plasticity. "As these findings show, intense musical training generates new processes within the brain, at different stages of life, and with a range of impacts on creativity, cognition, and learning."

High-voltage electric fields may aid scar tissue research

High voltage, short-pulsed electric fields, used for disinfection and solid tumour destruction, selectively damage cell membranes, while preserving overall tissue structure, a phenomenon that may be a key factor in scarless tissue regeneration.

Any organ or tissue after serious injury forms a scar, an enigma which has puzzled humans for thousands of years. The mechanism by which scars form is not known, and there are very limited therapies available to block scar formation. Now, a team based at the Center for Engineering in Medicine at the Massachusetts General Hospital report that high-voltage short electric fields appear to destroy all cells in skin tissue but lead to full regeneration with no scars. These strong but short-pulsed electric fields selectively kill the cells, while preserving the extracellular matrix tissue structure including the local blood supply, which are needed for healthy tissue growth and functional regeneration.

"It is a fascinating finding," says Alexander Golberg, PhD of MGH, the paper's first author. "We compared this technique with thermal burns and found many different aspects post-injury both in terms of the extent of damage and the dynamics of recovery".

Currently, pulsed electric fields are primarily used for disinfection and solid tumour ablation. Pulsed fields selectively kill cells in the tissue presumably by a mechanism called irreversible electroporation. After exposure to the fields, large pores appear in cell membranes that eventually lead to cell death.

"Previously, scarless regeneration has only been observed in adult amphibians and early in mammalian fetuses, both of which do not have an adaptive immune response. Even though our rodents had an intact adaptive immune system, we were able to generate scarless skin regeneration in these adult mammals. Further study of this technique will help us better understand the mechanism of scarring," says Martin L. Yarmush, MD, PhD, director of the MGH Center for Engineering in Medicine, the senior author of the paper.

"This development not only holds a great promise for unravelling many aspects of the complex wound healing process but also to potentially lead to new therapies," Golberg says. "We believe that this model will enable other laboratories to learn and uncover new aspects of adult tissue growth and development."

The paper is published in the inaugural issue of the new journal Technology.

● **doi:** 10.1142/S233954781320001X

Drug interactions cause significant impact on statin use

A new study has found that many people who stopped taking cholesterol-lowering statin drugs were also taking an average of three other drugs that interfered with the normal metabolism of the statins.

The other drugs can contribute to a common side-effect of taking statins – muscle pain – and often led people to discontinue use of a medication that could otherwise help save their lives, researchers learned.

The interactions of many drugs with statins have been known of for some time, researchers said, but are not being adequately managed by physicians and pharmacists, who could often choose different medications or adjust dosages to retain the value of statin drugs without causing this side-effect.

The research, done as part of a survey of more than 10,000 current and former statin users, found that use of medications which interfere with statin metabolism almost doubles the chance that a person will discontinue statin use due to muscle pain.

The issue is of growing importance because statin drugs are some of the most widely used medications in the world, proven to lower LDL, or "bad" cholesterol, and decrease the risk of heart attacks, heart disease, strokes and death. About 20 million people in the US now take statins, and new guidelines have just been issued to further expand the types of health conditions for which statins may be of benefit. Based on those guidelines, the number of statin users could increase to more than 30 million.

The findings were published in the *Journal of Clinical Lipidology* by scientists from Oregon State University and four other universities or research institutes.

"We've known for some time of many medications that can interact with statins, but only now is it becoming clear that this is a significant contributor to the side-effects, and often the reason some patients stop taking statins," said Matt Ito, a professor in the OSU College of Pharmacy and president of the National Lipid Association, which funded this study.

"This issue is something physicians, pharmacists and patients all need to be more aware of," Ito said. "There's a lot we can do besides discontinue use of these valuable medications. You can change dosages, use drugs that don't cause interactions, use different types of statins. Patients need to be proactive in understanding this issue and working with their health care providers to address it."

Besides drug interactions, statin side-effects are also more common in women and associated with increasing age, history of cardiovascular disease, and some other conditions. Statin discontinuation has also been associated with increased cardiovascular morbidity and death.

New research findings may aid early detection of Alzheimer's

Using scores obtained from cognitive tests, Johns Hopkins researchers think they have developed a model that could help determine whether memory loss in older adults is benign or a step on the way to Alzheimer's disease.

The risk of developing dementia increases markedly when a person is diagnosed with mild cognitive impairment, a noticeable and measurable decline in intellectual abilities that does not seriously interfere with daily life. But physicians have no reliable way to predict which people with mild cognitive impairment are likely to be in the 5 to 10% a year who progress to dementia.

In a proof-of-concept study, the Johns Hopkins investigators analyzed records of 528 people age 60 and over, who were referred to the Johns Hopkins Medical Psychology Clinic for cognitive testing as part of a dementia work-up between 1996 and 2004. The results were compared to those of 135 healthy older adults who participated in a study of normal aging. Both groups completed tests of memory, language, attention, processing speed and drawing abilities from which 13 scores were recorded.

Since each person is naturally more skilful in some areas than in others, the scores of healthy adults showed a symmetrical, bell-shaped range. Most of their scores were high, some were a bit lower, and a few were even lower. By grouping the patients into cohorts based on the severity of their dementia, the researchers found a trend in the test scores that is likely to mimic the deterioration of an individual's scores over time.

At the outset, he says, Alzheimer's disease subtly disrupts some mental abilities, while leaving others intact. Thus, well before a person develops clear cognitive impairment, his or her performance declines slightly on a few measures. When shown on a graph, these changes cause the healthy symmetric, bell-shaped curve to shift and become asymmetrical.

Regardless of how low a person's test scores were, the researchers determined that lopsidedness in their score distribution correlated with dementia. They predicted that people with low scores that were evenly distributed were not likely to develop dementia. But those with clearly lopsided test score distributions on the 13 measures administered were already experiencing varying levels of dementia.

"Departures from the normal bell-shaped pattern of variability on cognitive tests might determine which people with low scores develop dementia," says David J. Schretlen, Ph.D., a professor of psychiatry and behavioral sciences at the Johns Hopkins University School of Medicine and leader of a study published online in the November 2013 issue of the journal *Neuropsychology*.

Since these declines can be subtle, the researchers also increased the precision of cognitive testing by accounting for the effects of age, sex, race and education on test performance.

The challenge for doctors, Schretlen explains, is that most normal, healthy people will produce a few low scores on cognitive testing. That makes it nearly impossible to know at the outset whether a patient who reports forgetfulness and produces one or two low scores has a benign form of mild cognitive impairment, or is in the earliest stage of dementia. As a result, doctors often tell such patients to return for follow-up testing in a year or two.

But if future research confirms it, this new statistical model could help doctors get the prognosis right earlier in the disease, at the first visit, and start treating patients accordingly.

New research finds Mediterranean diet without breakfast best for diabetics

For patients with diabetes, it is better to eat a single large meal than several smaller meals throughout the day. This is the result of a current dietary study done at Linköping University in Sweden.

In the study, the effect on blood glucose, blood lipids and different hormones after meals were compared using three different macronutrient compositions in patients with Type 2 diabetes. The three diets were a low-fat diet, a low-carbohydrate diet and a Mediterranean diet. The scientists observed 21 patients that tested all three diets in a randomized order. During each test day, blood samples were collected at six time points.

The low-fat diet had a nutrient composition that has traditionally been recommended in the Nordic countries, with about 55% of the total energy from carbohydrates. The low-carbohydrate diet had a relatively low content of carbohydrate; approximately 20% of the energy was from carbohydrates and about 50% of the total energy came from fat. The Mediterranean diet was composed of only a cup of black coffee for breakfast, and with all the caloric content corresponding to breakfast and lunch during the other two test days accumulated to one large lunch.

Furthermore, the total caloric content included energy from 150 ml (women) to 200 ml (men) of French red wine to ingest with the lunch. The food in the Mediterranean diet had an energy content from carbohydrates that was intermediate between the low-fat and the low-carbohydrate meals, and sources of fat were mainly olives and fatty fish.

"We found that the low-carbohydrate diet increased blood glucose levels much less than the low-fat diet but that levels of triglycerides tended to be high compared to the low-fat diet," says Dr Hans Guldbrand, who, together with Professor Fredrik Nystrom, was the principal investigator of the study.

"It is very interesting that the Mediterranean diet, without breakfast and with a massive lunch with wine, did not induce higher blood glucose levels than the low-fat diet lunch, despite such a large single meal," says Professor Nyström.

"This suggests that it is favourable to have a large meal instead of several smaller meals when you have diabetes, and it is surprising how often one today refers to the usefulness of the so-called Mediterranean diet but forgets that it also traditionally meant the absence of a breakfast. Our results give reason to reconsider both nutritional composition and meal arrangements for patients with diabetes," says Professor Nystrom.

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NIH launches trial of investigational genital herpes vaccine

Researchers have launched an early-stage clinical trial of an investigational vaccine designed to prevent genital herpes disease. The US National Institute of Allergy and Infectious Diseases (NIAID), part of the National Institutes of Health, is sponsoring the Phase I trial, which is being conducted at the NIH Clinical Center in Bethesda, Maryland.

Genital herpes is one of the most common sexually transmitted infections in the United States. Most genital herpes cases are caused by infection with herpes simplex virus type 2 (HSV-2); however, herpes simplex virus type 1 (HSV-1) can also cause genital herpes. An estimated 776,000 people in the United States are infected with HSV-2 or HSV-1 each year. There is no vaccine to prevent genital herpes.

"Although genital herpes is treatable, it is a lifelong infection that can exact a substantial psychological and physical toll on infected individuals and places them at higher risk of acquiring HIV," said NIAID Director Anthony S. Fauci, M.D. "Furthermore, mothers with active genital herpes infection at time of delivery can transmit the virus to their newborns, which can lead to severe illness and death."

"A protective vaccine would help to reduce significantly the spread of this all-too-common sexually transmitted infection," Fauci added.

Led by principal investigator Lesia K. Dropulic, M.D., of NIAID's Laboratory of Infectious Diseases, the trial will test an investigational HSV-2 vaccine candidate, called HSV529, for safety and the ability to generate an immune system response. The investigational vaccine manufactured by Sanofi Pasteur was developed by David Knipe, Ph.D., professor of microbiology and immunobiology at Harvard Medical School, Boston.

Pre-clinical testing of the candidate vaccine involved a 10-year collaborative effort between Dr. Knipe and Jeffrey Cohen, M.D., chief of NIAID's Laboratory of Infectious Diseases. The experimental product is a replication-defective vaccine, meaning that scientists have removed two key proteins from the vaccine virus so that it cannot multiply to cause genital herpes.

The clinical trial is expected to enrol 60 adults ages 18 to 40, who will be divided into three groups of 20 participants each. The first group will be of people who have been previously infected with HSV-2 and HSV-1 or solely with HSV-2; the second will have individuals who had been infected with HSV-1 only; and the third will consist of those who have not been infected with HSV-1 or HSV-2. The investigational vaccine is being tested among study participants who have previously been infected with HSV to determine if it may pose any safety issues.

Within each of the three groups, researchers will randomly assign participants to receive three doses (0.5 milliliters each) of the investigational HSV529 vaccine (15 participants) or a saline-based placebo vaccine (five participants). The three vaccinations will occur at study enrollment and again one month and six months later. Participant safety will be monitored throughout the course of the trial, and researchers will follow participants for six months after they have received their last dose of vaccine. Blood samples will be used to evaluate the candidate vaccine's ability to stimulate immune system responses to HSV-2, including production of virus-specific antibodies and T-cell responses. The study is expected to be completed by October 2016.

HSV-2 is generally transmitted through sexual contact and can spread even when the infected individual shows no symptoms. Although HSV-1 commonly infects the mouth and lips, it can also cause genital herpes. Once in the body, HSV migrates to nerve cells and remains there permanently, where it can reactivate to cause painful sores and blisters.

New way to grow neural stem cells may aid brain therapy

Researchers have discovered a new, highly efficient way to produce neural stem cells from human pluripotent stem cells that can then go on to form neurons in the brain. The discovery, reported in the November 2013 issue of *Stem Cells Translational Medicine*, could greatly accelerate the development of new drug and cell therapies for people suffering from brain injuries or disease.

Human pluripotent stem cells (hPSCs), including human embryonic stem cells (hESCs) and human induced pluripotent stem cells (hiPSCs), show great promise in regenerative medicine due to their ability to be "coaxed" into becoming different specific types of cells. These cells can theoretically then go on to help the body heal itself by replacing or repairing damaged or dead cells.

However, the current methods for inducing neural stem cells involve time-consuming, multiple labor-intensive steps that cannot be easily automated or made GMP (good manufacturing practice) compliant for clinical grade manufacture. In addition, not many of the neural stem cells produced this way can be expanded and coaxed into becoming different neural subtypes specific to the brain regions responsible for controlling different functions.

"Towards this critical need, we have developed a simple one-step protocol with a GMP-manufactured medium that is rapid and efficient in the derivation of neural stem cells (from hPSCs) that retain the cues to differentiate into different disease relevant neurons. By starting with a million pluripotent stem cells, it is possible to get approximately 40 to 50 million neural stem cells in seven days," said Mohan C. Vemuri, Ph.D., director of research and development for Cell Biology and Stem Cell Systems at Life Technologies, Frederick, Md. He was lead author of the study done in conjunction with researchers from Buck Institute for Age Research, Novato, California, the Methodist Hospital Research Institute in Houston and the National Institutes of Health, Bethesda, Maryland.

"This method sets the stage for producing neural cells that potentially could lead to new therapies for diseases such as Parkinson's," he added.

"Whether the intended use is drug discovery or cell therapies for neurological diseases, it is essential to develop efficient and reproducible differentiation methods for neurons," said Anthony Atala, M.D.,

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editor of *Stem Cells Translational Medicine* and director of the Wake Forest Institute for Regenerative Medicine. "This study reports on a new method for the robust and reproducible production of neural stem cells."

doi: 10.5966/sctm.2013-0080

Newly discovered brown fat cells may help treat diabetes, obesity

Obesity and diabetes have become a global epidemic leading to severe cardiovascular disease. Researchers at the University of Utah believe their recent identification of brown fat stem cells in adult humans may lead to new treatments for heart and endocrine disorders, according to a new study published in the peer-reviewed journal Stem Cells.

The study was led by Amit N. Patel, M.D. M.S., director of Clinical Regenerative Medicine and Tissue Engineering, and associate professor in the Division of Cardiothoracic Surgery at the University of Utah School of Medicine.

Prior to Patel's study, it was thought that brown fat stem cells did not exist in adults. Children have large amounts of brown fat that is highly metabolically active, which allows them to eat large amounts of food and not gain weight. Patel notes, adults generally have an abundance of white fat in their bodies, which leads to weight gain and cardiovascular disease but this is not seen in brown fat. As people age, the amount of white fat increases and brown fat decreases which contributes to diabetes and high cholesterol.

"If you have more brown fat, you weigh less, you're metabolically efficient, and you have fewer instances of diabetes and high cholesterol. The unique identification of human brown fat stem cells in the chest of patients aged from 28 to 84 years is profound. We were able to isolate the human stem cells, culture and grow them, and implant them into a pre-human model which has demonstrated positive effects on glucose levels," said Patel.

The new discovery of finding brown fat stem cells may help in identifying potential drugs that may increase the body's own ability to make brown fat or find novel ways to directly implant the brown fat stem cells into patients.

Researchers find two forms of Parkinson's

Why can the symptoms of Parkinson's disease vary so greatly from one patient to another? A consortium of researchers, headed by a team from the Laboratoire CNRS d'Enzymologie et Biochimie Structurales, is well on the way to providing an explanation.

Parkinson's disease is caused by a protein known as alpha-synuclein, which forms aggregates within neurons, killing them eventually. The researchers have succeeded in characterizing and producing two different types of alpha-synuclein aggregates. Better still, they have shown that one of these two forms is much more toxic than the other and has a greater capacity to invade neurons.

This discovery takes account, at the molecular scale, of the existence of alpha-synuclein accumulation profiles that differ from one patient to the next. These results, published October 10 in *Nature Communications*, represent a notable advance in our understanding of Parkinson's Disease and pave the way for the development of specific therapies targeting each form of the disease.

Parkinson's Disease, which is the second most frequent neurodegenerative disease after Alzheimer's, affects some 150,000 people in France. According to those suffering from the disease, it can manifest itself in the form of uncontrollable shaking (in 60% of patients) or by less localized symptoms such as depression, behavioural and motor disorders. These differences in symptoms point to different forms of Parkinson's disease.

This condition, for which no curative treatment currently exists, is caused by the aggregation in the form of fibrillar deposits of alpha-synuclein, a protein that is naturally abundant at neuron junctions. These misfolded alpha-synuclein aggregates propagate between neurons. When they invade a new neuron, they are capable of recruiting normal alpha-synuclein and adding it to the deposit.

For this reason, many researchers advocate that the alpha-synuclein of the aggregates should be considered as an infectious protein, in other words a prion. Highly toxic, the alpha-synuclein deposits end up by triggering a process of apoptosis, i.e. cell death.

The researchers have shown that there is not just one single type of aggregate. They succeeded in producing two types of aggregate that only differ in how the protein stacks up. At the millionth of a millimetre scale, the first form of aggregate resembles spaghetti, whereas the second form is long and flat, recalling the shape of wider pasta such as linguine. The team of scientists then tried to determine whether these structural differences result in functional differences.

To find out, they placed the two types of aggregates in contact with neuronal cells in culture. They discovered that the capacity of the "spaghetti" form to bind to and penetrate cells is notably greater than that of the "linguine" form. The "spaghetti" form is also considerably more toxic and rapidly kills the infected cells. This form has shown itself to be capable of resisting the cell mechanisms responsible for eliminating it, whereas the "linguine" form is, to a certain extent, controlled by the cell.

The researchers are convinced that the existence of at least two forms of alpha-synuclein aggregates explains why doctors are faced with different Parkinson's Diseases depending on the patient. Experiments on mice are currently under way to confirm this hypothesis. Furthermore, the scientists consider that analysis of the type of aggregate could lead to an efficient diagnosis method, which would make it possible, in particular, to assess the virulence of the disease for each patient.

Finally, they hope that by refining the characterization of the structure of the aggregates, it will be possible to develop targeted therapeutic strategies for each variant in order to slow down the propagation of abnormal alpha-synuclein within the brain. MEH

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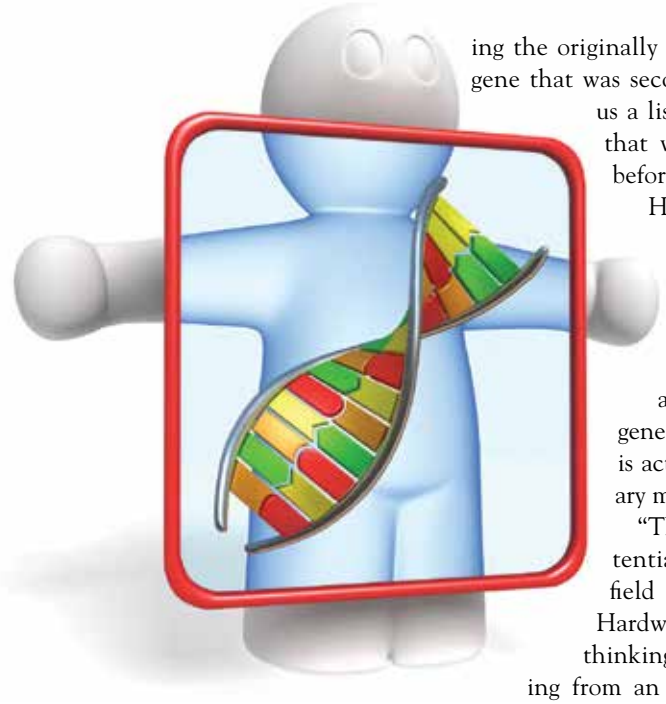

Gene mutation research calls for rethink on cancer gene analysis

Johns Hopkins researchers report that the deletion of any single gene in yeast cells puts pressure on the organism's genome to compensate, leading to a mutation in another gene. Their discovery, which is likely applicable to human genetics because of the way DNA is conserved across species, could have significant consequences for the way genetic analysis is done in cancer and other areas of research, they say.

Summarized in a report published November 21, 2013 in *Molecular Cell*, the team's results add new evidence that genomes, the sum total of species' genes, are like supremely intricate machines, in that the removal of a single, tiny part stresses the whole mechanism and might cause another part to warp elsewhere to fill in for the missing part.

"The deletion of any given gene usually results in one, or sometimes two, specific genes being 'warped' in response," says J. Marie Hardwick, Ph.D., the David Bodian Professor of Molecular Microbiology and Immunology at the Johns Hopkins Bloomberg School of Public Health and a professor of pharmacology and molecular sciences at the school of medicine. "Pairing the originally deleted gene with the gene that was secondarily mutated gave us a list of gene interactions that were largely unknown before."

Hardwick says the findings call researchers to greater scrutiny in their genetic analyses because they could unwittingly attribute a phenomenon to a gene they mutated, when it is actually due to a secondary mutation.

"This work has the potential to transform the field of cancer genetics," Hardwick says. "We had been thinking of cancer as progressing from an initial mutation in a tumour-suppressor gene, followed by additional mutations that help the cancer thrive. Our work provides hard evidence that a single one of those 'additional mutations' might come first and actively provoke the mutations seen in tumour-suppressor genes. We hope that our findings in yeast will help to identify these 'first' mutations in tumours."

The beauty of working with yeast, Hardwick says, is that it is easy to delete, or "knock out," any given gene. Her team started with a readily available collection of thousands of different yeast strains, each with a different gene knockout.

At their preferred temperature, each of these strains of yeast grows robustly even though they each have a different gene missing. Hardwick's team first asked a fundamental question: Within a given strain of yeast, does each cell have the same genetic sequence as the other cells, as had generally been presumed?

"We know, for example, that within a given tumour, different cells have different mutations or versions of a gene," explains Hardwick. "So it seemed plausible that other cell populations would exhibit a similar genetic diversity."

To test this idea, her team randomly chose 250 single-knockout strains from the thousands of strains in the collection. For each strain, they generated six sub-strains, each derived from a single yeast cell from the "parental batch."

They then put each sub-strain through a "stress test" designed to detect sub-strains with behaviours that varied from the behaviour of the parental batch. All of the sub-strains grew indistinguishably without stress, but when the temperature was gradually raised for only a few minutes, some sub-strains died because they could not handle the stress.

When the Hardwick team examined their genes, they found that, in addition to the originally knocked-out gene, each of the sub-strains that faltered also had a mutation in another gene, leading the team to conclude that the cells in each strain of the single-gene knockouts do not all share the same genetic sequence.

They then tested all 5,000 of the original single-gene knockout strains to find sub-strains that could overgrow when given low-nutrient food – a trait that tumour cells often possess. This was another stress test designed to detect differences between the individual cells taken from the parental batches. They identified 749 such knockout strains and showed that their growth differences were often due to secondary mutations.

In total, the team's evidence indicates that 77% of all the knockout strains have acquired one or two additional mutations that affect cell survival and/or excessive growth when food is scarce.

Hardwick believes that stressing yeast in other ways may lead to an even higher percentage of double-mutant strains. In fact, she said she believes that "essentially any gene, when mutated, has the power to alter other genes in the genome". Deleting the first gene seems to cause a biological imbalance that is sufficient to provoke additional adaptive genetic changes, she explains.

Furthermore, in all of the strains that they examined, they found that the secondary mutations that appeared after a given knockout were always in the same one or two genes as in their earlier ob-

servations. Unexpectedly, Hardwick said, the altered growth of the sub-strains was usually due to the secondary mutations, not the original knockout, and many of those secondary mutations were in genes that are known to be cancer-causing in humans.

● **doi:** 10.1016/j.molcel.2013.09.026

Two human proteins found to affect "jumping gene"

Using a new method to catch elusive "jumping genes" in the act, researchers have found two human proteins that are used by one type of DNA to replicate itself and move from place to place. The discovery, described in *Molecular Cell* in November 2013, breaks new ground, they say, in understanding the arms race between a jumping gene driven to colonize new areas of the human genome and cells working to limit the risk posed by such volatile bits of DNA.

Jumping genes, more formally known as transposons or transposable elements, are DNA segments with the blueprints for proteins that help to either copy the segment or remove it, then insert it into a new place in the genome. Human genomes are littered with the remnants of ancient jumping genes, but because cells have an interest in limiting such trespasses, they have evolved ways to regulate them. Most jumping genes have mutated and can no longer move, but these "rusting hulks" are still passed down from generation to generation.

One exception is a jumping gene called L1, which has been so successful that copies of it make up about 20% of human DNA. While many of these copies are now mutated and dormant, others are still active and thus the subject of much interest by geneticists.

"Human cells have evolved ways of limiting jumping genes' activity, since the more frequently they move, the more likely they are to disrupt an important gene and cause serious damage," says Lixin Dai, Ph.D., a post-doctoral associate at the Johns Hopkins Institute for Basic Biomedical Sciences, who led the study. To find out more about how cells control L1 and what tricks the jumping gene uses to get around these defences, Dai and others in the laboratory of Jef Boeke, Ph.D., first induced lab-grown human cells to make large amounts of the proteins for which L1 contains the blueprints. As expected, the two types of L1 protein joined with human proteins and genetic material called RNA to form so-called ribonucleoprotein particle complexes, which L1 uses to "jump".

To find out which human proteins interact with ribonucleoproteins – and are therefore likely to have a role in either tamping down its activity or helping it along – Boeke's team collaborated with researchers at The Rockefeller University who had developed a technique for fast-freezing yeast with liquid nitrogen, then grinding it up for analysis with steel balls and very rapidly pulling out the ribonucleoproteins with tiny magnetic particles. "It's a good way of preserving the interactions," Dai says.

Adapting this powerful technique to human cells, the team found 37 proteins that appear to interact with the ribonucleoprotein, and they selected two for further analysis. One of these, UPF1, is known for its role in quality control; it monitors the RNA transcripts that carry instructions from DNA to the cell's protein-making machinery and destroys those with mistakes. In this case, Dai says, UPF1 binds to the L1 ribonucleoprotein, probably because L1 RNA contains instructions for two proteins rather than one – a red flag for UPF1. When the researchers disabled the UPF1 gene, cells produced more L1 RNA and protein. But they still haven't figured out exactly how UPF1 interacts with the ribonucleoprotein, Dai says.

The other human protein, PCNA, helps to copy DNA strands before a cell divides into two. The researchers found that PCNA interacts with a critical segment of one of the ribonucleoprotein's L1 proteins; when they tried altering that section, L1 could no longer jump. In contrast to UPF1's role in suppressing L1 activity, Dai says PCNA seems to have been co-opted into helping the jumping gene, perhaps by repairing gaps left in human DNA after L1 splices itself into a new spot.

Dai notes that these discoveries would not have been possible without two methods pioneered in this study: growing large quantities of human cells and inducing them to make ribonucleoprotein, and adapting the fast-freezing technique to study interactions in human cells. He expects that these methods will enable biologists to greatly increase their understanding of L1, a jumping gene that has played a key role in the evolution of the human genome and whose activity has been implicated in some cancers.

"Our study shows how the jumping gene tries to be smart and get around the host cell's control mechanisms, and how the host tries to minimize its activity," Dai says. "We're looking forward to learning more about this arms race." MEH

Access to healthcare, polio and road traffic safety among key issues highlighted at 60th WHO EMR annual meeting

Dr Ala Alwan, WHO Regional Director of the World Health Organization for the Eastern Mediterranean, addresses the meeting

HRH Princess Muna Al-Hussein, the WHO Patron of nursing and midwifery in the Eastern Mediterranean Region, called for a stronger public health system

Dr Mohammed bin Ahmed Al Saidi, Minister of Health of Oman, said more must be done for the health of communities

The Sixtieth Session of the WHO Regional Committee for the Eastern Mediterranean was held in the Omani capital Muscat from 27-30 October 2013. The session looked at a number a public health issues and passed several resolutions pertinent to the region, including universal health coverage, polio and road traffic safety.

In his opening speech, Dr Ala Alwan, WHO Regional Director of the World Health Organization for the Eastern Mediterranean, praised the advances that Oman has made in health and social developments Oman over the past four decades, through its sustained commitment to health and social development and careful planning.

"The excellent collaboration between WHO and Oman is a model that we aim for with all Member States, and I extend my particular appreciation to Oman for this admirable achievement," said Dr Alwan.

The Regional Director highlighted a number of issues, such as strengthening health systems, universal health coverage, maternal and child health, international health regulations, polio, non-communicable diseases and the challenges faced by the Region regarding health and the environment.

In her opening remarks HRH Princess Muna Al-Hussein, the WHO Patron of nursing and midwifery in the Eastern Mediterranean Region, stressed the importance of strengthening public health by prioritising the promotion of public health.

Dr Mohammed bin Ahmed Al Saidi, Minister of Health of Oman, concluded the opening ceremony saying the emergence of several health issues as priorities makes it obligatory for all of us to do more for the health of our communities. There was an urgent need for more commitment especially with the profound political, social and economic changes in a number of countries in the region.

Dr Saidi said: "The past two years has revealed the huge differences in the response of health systems, and the need to take urgent measures to bridge the gaps.

"Strengthening health systems and making them more efficient is a fundamental strategy to promote comprehensive development [in public health]."

A number of resolutions were passed at the meeting. Importantly, one of the resolutions addresses the escalation of polio in the region, declared the circulation of the polio virus in the region as an emergency for all Member States. It called on Pakistan to take necessary steps to ensure all children are assessed and vaccinated as a matter of utmost emergency to prevent further international spread and requested the Syrian Arab Republic and adjoining countries to coordinate, and if possible, to synchronize, intensified mass vaccination campaigns using the most appropriate tactics and vaccines to stop this new outbreak within six months.

Another resolution addresses universal health coverage. In this context the Regional Committee called on Member States to ensure sustained political commitment to universal health coverage in order to ensure that all people have access to essential health services that are of sufficient quality without the risk of financial hardship.

The Regional Committee also endorsed the Dubai Declaration: Saving the lives of mothers and children: rising to the challenge. Committee Members urged high-burden countries to strengthen multisectoral partnership in order to implement their national acceleration plans and allocate the necessary human and financial resources and mobilize additional resources as necessary.

The Regional Committee also endorsed the regional strategy for the improvement of civil registration and vital statistics system 2014–2019.; urging Member States to give priority to the strengthening of their national systems and develop multisectoral

strategies to improve civil registration and vital statistics systems based on the findings of an in-depth assessment and guided by the regional strategy.

Another strategy endorsed by the Regional Committee was the Regional strategy on health and environment 2014-2019 and its framework for action. It requested the Regional Director to provide technical support to Member States to adapt and implement the regional strategy and to build partnerships with United Nations agencies and other relevant stakeholders

Adopting the Annual Report of the Regional Director for 2012, the Regional Committee urged middle income countries to participate in the pooled vaccine procurement system and to sign a memorandum of understanding with WHO and UNICEF to complete the participation process before the end of 2013. The Regional Committee requested the Regional Director to support Member States in developing and implementing strategies and self-delivery approaches for rapid scale-up of HIV treatment to improve the quality of the planning cycle by building capacity at the three levels of the Organization and improving monitoring mechanisms.

on the WEB WHO EMRO RC 60
www.emro.who.int/about-who/rc60

WHO EMRO releases global status report on road safety 2013

Eastern Mediterranean Region accounts for 10% of the world's road traffic deaths

The *Global status report on road safety 2013: supporting a Decade of Action* was released at the 60th WHO Eastern Mediterranean Regional Committee. The report provides an update of the road safety situation in countries across the world. More importantly it sets the baseline for monitoring action through the Decade of Action for Road Safety 2011–2020.

The report presents information from 182 countries – including 19 countries from the Eastern Mediterranean Region – accounting for almost 99% of the world's population or 6.8 billion people.

Among other important information, the report shows that only 28 countries, covering 7% of the world's population, have comprehensive road safety laws on five key risk factors: drinking and driving, speeding, failing to use motorcycle helmets, seat-belts and child restraints. It indicates that, among other measures, the pace of legislative change needs to rapidly accelerate if the United Nations Decade of Action for Road Safety 2011–2020 is to meet its target of saving 5 million lives.

The report also documents that between 2007 and 2010, 88 countries managed to reduce the number of deaths on their roads, showing that improvements are possible. However, the number of deaths increased in 87 countries during the same period.

Worldwide the total number of road traffic deaths remains unacceptably high at 1.24 million per year.

Eastern Mediterranean Region

Data from the Eastern Mediterranean Region show that it accounts for 10% of the world's road traffic deaths and has the second highest road traffic fatality rate among WHO regions after the African Region. Middle-income countries of the Region account for over 85% of its road traffic deaths. On the other hand high-income countries in the Region have road traffic death rates that are double the rates in high-income countries in other regions of the world.

This clearly shows that road traffic injuries pose a grave problem for all countries in the Region regardless of their income level.

More alarming is that the younger productive age groups are hardest hit. About 60% of those who are killed in road traffic crashes are between the ages of 15 and 44 years, and over 75% are male. This is in line with the most updated Global Burden of Disease Data 2010, which shows that road traffic crashes are the leading cause of death among those aged 15-29 years in the Eastern Mediterranean Region.

Of all road traffic victims in the Eastern Mediterranean Region, about 45% are vulnerable road users. The highest toll is among pedestrians followed by motorcyclists and bicyclists. Yet only a few countries have national policies and enabling environments to encourage walking and cycling or to separate vulnerable road users.

> Road traffic crashes are the leading cause of death among people aged 15-29 years in the Eastern Mediterranean Region.

Laws on key risk factors are available in the majority of the Region's countries, but are mostly not comprehensive. This, together with inadequate enforcement, limits their effectiveness. And although most countries have post-crash care systems, these need strengthening both in terms of trauma care and rehabilitation.

The 2013 Global status report is the second in a series analysing the extent to which countries are implementing a number of effective road safety measures. In addition to the five risk factors noted above, it highlights the importance of issues such as vehicle safety standards, road infrastructure inspections, policies on walking and cycling and aspects of pre-hospital care systems. It also indicates whether countries have a national strategy which sets measurable targets to reduce the number of people killed and seriously injured on the roads.

on the WEB *Global status report on road safety 2013*
http://tinyurl.com/cls2cjy

Polio outbreak in Syria prompts massive immunization campaign across Middle East

The largest-ever immunization campaign in the Middle East is under way, aiming to vaccinate more than 23 million children under the age of five against polio in Syria and neighbouring countries.

The campaign, launched by the World Health Organization and UNICEF, is a crucial part of the response to an outbreak of the disease in Syria, where 17 cases, caused by wild poliovirus type 1 (WPV1), have so far been confirmed (December 2013), and to the detection of the virus in environmental samples in other parts of the Middle East. Fifteen of these children are in the contested governorate of Deir Ez Zour, one is in Aleppo and another in Douma, near Damascus. Prior to this outbreak, no polio cases had been recorded in Syria since 1999, but vaccination efforts have suffered during the last three years of conflict.

Genetically-related polio viruses, which originated in Pakistan, have also been detected in sewage samples in Egypt in December 2012, and in Israel and the West Bank and Gaza Strip earlier in 2013. In a joint resolution, all countries of the WHO Eastern Mediterranean Region have declared polio eradication to be an emergency and called on Pakistan to urgently access and vaccinate all of its children to stem the international spread of its viruses.

Organizers aim to vaccinate, repeatedly over the next few months, all children under the age of five, whether they are living at home or displaced by conflict. The WHO has said the vaccinations would take place in Egypt, Iraq, Jordan, Lebanon, the West Bank, Gaza Strip and Turkey. Depending on the area, vaccination will be offered at fixed sites at populous locations or by going from house to house. The activities are carried out by national and local health authorities supported by UNICEF, WHO, the Syrian Arab Red Crescent and other partners.

Inside Syria, the campaign aims to reach 2.2 million children, including those who live in contested areas and those who were missed in an earlier campaign. Many children in Syria remain inaccessible, particularly those trapped in sealed off areas or living in areas where conflict is ongoing. A surveillance alert has been issued for the region to actively search for additional potential cases in addition to implementing the recommended supplementary immunization activities with oral polio vaccine.

Children at Atme camp for displaced people in northern Syria, near the border with Turkey. Children in Syria are at risk of getting polio following an outbreak of the disease in the country.

UOSSM (Union of Syrian Medical Relief Organizations) has asked the WHO and UNICEF to extend their vaccination campaign against polio to areas under opposition control. In one report, Dr Khaled Almilaji reported that in the rebel-controlled areas, "the virus is spreading faster, where millions of people are displaced and living in dire conditions. Families are drinking directly from the rivers, dependent on contaminated water, which can carry the virus. The opposition's Polio Task Force charge that the Damascus-based program is not reaching all the vulnerable children in rebel areas."

Despite the gaps in coverage, however, initial information suggests that vaccine is getting to more areas of Syria than has so far been the case for health interventions delivered as part of the larger ongoing humanitarian effort. In parallel with the vaccination effort, work is ongoing to bolster systems for verifying coverage data in upcoming campaigns inside the war-torn country. At one public health centre in Al Hassakeh in eastern Syria, where 23 UNHCR-supported health volunteers are providing awareness sessions on issues relating to polio and other health-related issues, in one month the number of children attending the centre rose from 46 to 1 357. So far, throughout Al Hassakeh province, 87,728 children have been vaccinated, including 7,676 children who were vaccinated by UNHCR-supported volunteers.

"All Syrian children should be protected from disease," noted Dr Ala Alwan, Regional Director, WHO Eastern Mediterranean Region. "To eradicate polio, we need to eradicate any reason for failing to reach children."

Over the coming months, UNICEF is planning to deliver 10 million doses of polio vaccine to Syria. The first shipment of two million vaccines arrived in Damascus on 29 November. All countries of the WHO Eastern Mediterranean Region have united in calling for support to negotiate and establish access to those children who are currently unreached with polio vaccination. It is anticipated that the outbreak response will need to continue for at least six to eight months, depending on the area and based on evolving epidemiology. In Syria, these campaigns will be carried out at monthly intervals until April this year.

The total cost to UNICEF and WHO of supporting the seven-country polio response from November through April is US$39 million, based on a strategic plan developed for the Middle East. MEH

Dubai meeting of policymakers calls for better universal health coverage

The World Health Organization, in collaboration with the Ministry of Health of the United Arab Emirates, organised a regional meeting on accelerating progress towards universal health coverage: global experiences and lessons for the Eastern Mediterranean Region, in Dubai from 5 to7 December 2013.

Universal health coverage is emerging as a global health priority which is likely to occupy a significant place in any future global development agenda.

Universal health coverage means that all people have access to good quality health care, without running the risk of financial ruin. This means without having to pay from their own pocket excessive amounts that would either limit their spending on other essential services or push them into poverty. Universal health coverage focuses on all types of health service and not just treatment.

The focus on universal health coverage is not new. The aspiration goes back to the WHO Constitution of 1948 and the Alma-Ata Declaration of 1978. However, the world is not there yet. Every year, millions of people in the world and in the Eastern Mediterranean Region are still deprived of health care, and millions others experience financial hardship because of the way health services are organized, delivered and financed.

Recently, the move towards universal health coverage has gained momentum. It was the focus of many global reports. The subject was also presented before the last two sessions of the WHO Regional Committee for the Eastern Mediterranean. Having a comprehensive vision, evidence-based strategy and a well-laid out roadmap, and associated framework of action, remain essential for making progress towards universal health coverage.

The Dubai meeting brought together high-level policy-makers, health professionals, representatives of civil society and development partners from all parts of the world, as well as members of scientific circles, academia and concerned nongovernmental organisations.

The purpose of the meeting was to reflect on the latest thinking with regard to addressing the challenges in pursuing universal health care and to share the lessons learned from countries that have succeeded in reforming their national health systems so as to move towards universal health coverage.

At the opening of the meeting Dr Ala Alwan, WHO Regional Director for the Eastern Mediterranean, reiterated the importance of the meeting and its expected results: "We will discuss the strategic roadmap that was endorsed by the Regional Committee and how to implement it through a framework for action in the Region. This will then need to be followed by development of country-specific roadmaps, starting with generating evidence and engaging in national policy dialogue."

Out-of-pocket

"In some low-income countries in the Region, people still pay for more than 70% of health expenses out of their own pocket," Dr Alwan said.

"The high share of direct payment limits people's access to much needed health services and exposes those in need of health care to a higher risk of financial catastrophe and impoverishment. It is estimated that each year, up to 16.5 million people in the Region encounter financial ruin, and up to 7.5 million individuals become poor due to out-of-pocket payments for health services.

"While population coverage has reached close to 100% for nationals in several high-income countries of the Region, the coverage of non-nationals has yet to reach the same level. For most middle-income countries the population coverage ranges between 40-90%, whereas it continues to lag at around 25% for low-income countries.

"Solutions to address these challenges need to be identified and adapted to country needs," Dr Alwan emphasized.

The high share of direct payment limits people's access to much needed health services and exposes those in need of health care to a higher risk of financial catastrophe and impoverishment

Political commitment

He stressed that political commitment to universal health coverage is essential and can be achieved by:

- providing a national vision, strategy and roadmap
- devising evidence-based healthcare financing strategies
- expanding the provision of integrated people-centred health services
- progressively expanding coverage to all population groups

Advancing the achievement of universal health coverage also requires the availability of the necessary health workforce; the accessibility of essential medicines and technologies; the presence of good governance and leadership; the provision of good quality services; and the production of appropriate information for decision-making.

The challenges and opportunities for universal health coverage have been found to be common to all countries in the Region, although to varying extent, which reflects the need for efforts to enhance universal health care across the entire Region. MEH

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REHABILITATION
2013-14

2.3 billion people benefit from anti-tobacco programs

The number of people worldwide covered by at least one life-saving measure to limit tobacco use has more than doubled to 2.3 billion in the past five years, according to the WHO *Report on the Global Tobacco Epidemic*, 2013.

The number of people covered by bans on tobacco advertising, promotion and sponsorship, the focus of this year's report, increased by almost 400 million people, residing mainly in low- and middle-income countries.

Furthermore, the Report shows that 3 billion people are now covered by national anti-tobacco campaigns. As a result, hundreds of millions of non-smokers are less likely to start.

However, the Report notes, to achieve the globally agreed target of a 30% reduction of tobacco use by 2025, more countries have to implement comprehensive tobacco control programs.

Bans on tobacco advertising, promotion and sponsorship are some of the most powerful measures to control tobacco use. To date, 24 countries with 694 million people have introduced complete bans and 100 more countries are close to a complete ban.

In the Eastern Mediterranean Region, only six out of 23 countries are fully protected from exposure to the tobacco industry advertising, promotion and sponsorship tactics.

"We know that tobacco advertising, promotion and sponsorship are critical to the industry's continued physical and political expansion", says Dr Ala Alwan, WHO Regional Director for the Eastern Mediterranean. "That is why the tobacco industry continues to fight bans through minimum concessions, half measures, voluntary self-regulation, claims of corporate social responsibility and numerous other innovative ways".

Tobacco is the leading cause of preventable death globally, killing six million people every year. It can cause cardiovascular disease, cancer, diabetes and chronic respiratory diseases. "Unless we act, tobacco will kill more than eight million people every year by 2030," says Dr Alwan. "More than 80% of these preventable deaths will be among people living in low- and middle-income countries".

Tobacco companies are spending tens of billions of dollars each year on advertising, promotion and sponsorship.

"As tobacco use decreases in many countries, partly due to restrictions on marketing and use," explains Dr Alwan, "the tobacco industry is switching its focus to the developing world where there are large and growing markets and fewer restrictions. In particular, as potential customers, young people and women present a major marketing opportunity for the tobacco industry".

Other key findings of the report include – in the past five years:

- A total of 20 countries with 657 million people put strong warning label requirements in place.
- More than half a billion people in nine countries have gained access to appropriate cessation services.
- There are 32 countries that passed complete smoking bans covering all work places, public places and public transportation means, protecting nearly 900 million additional people.

In 2008, WHO identified six evidence-based tobacco control measures that are the most effective in reducing tobacco use. Known as "MPOWER", these measures correspond to one or more of the demand reduction provisions included in the WHO Framework Convention on Tobacco Control (WHO FCTC):

* Monitor tobacco use and prevention policies,
* Protect people from tobacco smoke,
* Offer help to quit tobacco use,
* Warn people about the dangers of tobacco,
* Enforce bans on tobacco advertising, promotion and sponsorship, and

* Raise taxes on tobacco.

This year's report is the fourth in the series of WHO reports on the status of the MPOWER measures. These measures provide countries with practical assistance to reduce demand for tobacco in line with the WHO FCTC, thereby reducing related illness, disability and death.

The WHO FCTC entered into force in 2005 and, with 177 parties today, is a powerful tool to combat the deadly tobacco epidemic. MEH

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[1] U.S. News & World Report
[2] NeuStrategy, Inc.

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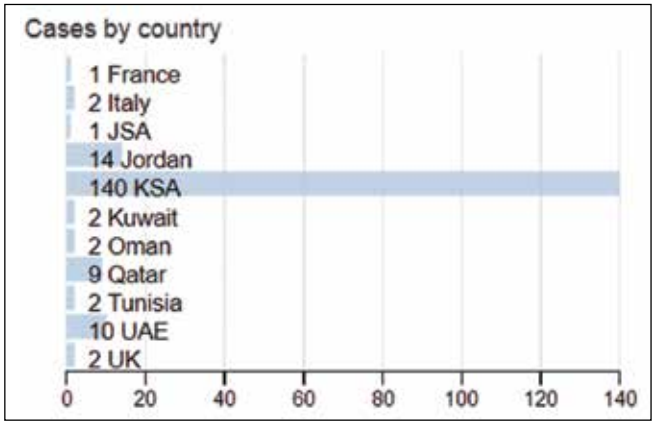
MERS-CoV found in camels

The International Health Regulations Emergency Committee held their fourth meeting to discuss the latest developments with MERS-CoV on December 4. The Committee concluded that it saw no reason to change its previous advice to the Director-General that the conditions for a Public Health Emergency of International Concern (PHEIC) have not at present been met. However, the Committee stated that situation continues to be of concern, in view of ongoing cases and of new information about the presence of the virus in camels. The Committee plans to meet again in March.

As of December 17, the WHO states it has been informed of a total of 165 laboratory-confirmed cases of infection with MERS-CoV, including 71 deaths.

CIDRAP, the Center for Infectious Disease Research and Policy at the University of Minnesota reports (December 12 - *http://tinyurl.com/nhsb5t3*) that reports that dromedary camels in Jordan and Saudi Arabia were found to have antibodies to the virus or one closely related to it.

CIDRAP cites two studies published in *Eurosurveillance** in which Jordanian and European researchers reported that 11 of 11 camels tested in Jordan had MERS-CoV-like antibodies. The second study found that 280 of 310 dromedary camels from various parts of Saudi Arabia had antibodies to MERS-CoV or a very similar virus. In both studies tests in goats, sheep,



Epidemic - *http://epidemic.bio.ed.ac.uk*

MERS-CoV cases by country – 185 cases in total (18 Dec 2013). NOTE: The Epidemic website points out that the list of cases has been gathered from various sources including WHO bulletins and media reports. It contains some cases that were not laboratory-confirmed (but are extremely likely).

MERS-CoV FAQ

The World Health Organisation answers some frequently answered questions about MERS-CoV.

What is coronavirus?

Coronaviruses are a large family of viruses that cause illness in humans and animals. In people, coronaviruses can cause illnesses ranging in severity from the common cold to Severe Acute Respiratory Syndrome (SARS).

The novel coronavirus, first detected in April 2012, is a new virus that has not been seen in humans before. In most cases, it has caused severe disease. Death has occurred in about half of cases.

This new coronavirus is now known as Middle East respiratory syndrome coronavirus (MERS-CoV). It was named by the Coronavirus Study Group of the International Committee on Taxonomy of Viruses in May 2013.

Where are MERS-CoV infections occurring?

Nine countries have now reported cases of human infection with MERS-CoV. Cases have been reported in France, Germany, Italy Jordan, Qatar, Saudi Arabia, Tunisia, the United Arab Emirates, and the United Kingdom. All cases have had some connection (whether direct or indirect) with the Middle East. In France, Italy, Tunisia and the United Kingdom, limited local transmission has occurred in people who had not been to the Middle East but who had been in close contact with laboratory-confirmed or probable cases.

How widespread is MERS-CoV?

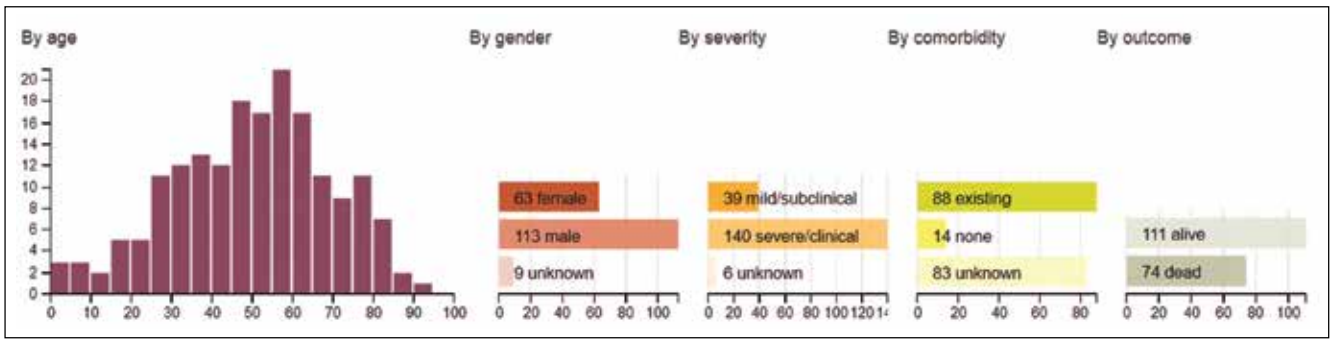
How widespread this virus may be is still unknown. WHO encourages Member States to continue to closely monitor for severe acute respiratory infections (SARI) and to carefully review any unusual patterns of SARI or pneumonia. WHO will continue to share information as it becomes available.

What are the symptoms of MERS-CoV?

Common symptoms are acute, serious respiratory illness with fever, cough, shortness of breath and breathing difficulties. Most patients have had pneumonia. Many have also had gastrointestinal symptoms, including diarrhoea. Some patients have had kidney failure. About half of people infected with MERS-CoV have died. In people with immune deficiencies, the disease may have an atypical presentation. It is important to note that the current understanding of illness caused by this infection is based on a limited number of cases and may change as we learn more about the virus.

What is the significance of the recent finding of MERS-CoV in camels?

On 11 November, the Ministry of Health of Saudi Arabia announced that MERS-CoV had been detected in a camel linked to a human case in Saudi Arabia. This finding is consistent with previously published reports of MERS-CoV reactive antibodies in camels, and adds another important piece of information to our understanding of MERS-CoV ecology. However, this finding does not necessarily implicate camels directly in the chain of transmission to humans. The critical



Epidemiology of MERS-CoV (18 Dec 2013)

and cows were negative. Earlier last year researchers found MERS-CoV like antibodies in camels in Oman, Egypt, and the Canary Islands.

The research centre points out, however, that "it remains unclear whether camels are a source of MERS-CoV in humans, because no one has yet demonstrated a close genetic match between a camel MERS-CoV isolate and a human isolate", but adds that "the new findings seem to strengthen the evidence that many camels in the Middle East have been exposed to the pathogen".

At the December 4 meeting the IHR Emergency Committee emphasized he need for:

- investigative studies, including international case-control, serological, environmental, and animal-human interface studies, to better understand risk factors and the epidemiology;
- further review and strengthening of such tools as standardized case definitions and surveillance and further emphasis on infection control and prevention.

* **Reusken CB, Ababneh M, Raj VS**, et al. Middle East respiratory syndrome coronavirus (MERS-CoV) serology in major livestock species in an affected region in Jordan, June to September 2013. Eurosurveill 2013 Dec 12;50 (18): pii=20662

Hemida MG, Perera RA, Wang P, et al. Middle East respiratory syndrome (MERS) coronavirus seroprevalence in domestic livestock in Saudi Arabia, 2010 to 2013. Eurosurveill 2013 Dec 12;50(18):pii=2065

question that remains about this virus is the route by which humans are infected, and the way in which they are exposed. Most patients who have tested positive for MERS-CoV had neither a human source of infection nor direct exposure to animals, including camels. It is still unclear whether camels, even if infected with MERS-CoV, play a role in transmission to humans. Further genetic sequencing and epidemiologic data are needed to understand the role, if any, of camels in the transmission of MERS CoV to humans.

How do people become infected with this virus?

We do not yet know how people become infected with this virus. Investigations are underway to determine the source of the virus, the types of exposure that lead to infection, the mode of transmission, and the clinical pattern and course of disease.

How is the virus being transmitted to humans?

We still do not know the answer to this question. It is unlikely that transmission of the MERs-CoV to people occurs through direct exposure to an infected camel, as very few of the cases have reported a camel exposure. More investigations are needed to look at the recent exposures and activities of infected humans. WHO is working with partner agencies with expertise in animal health and food safety, including FAO, OIE and national authorities, to facilitate these investigations. Many technical organizations are offering their expertise to assist ministries responsible for human health, animal health, food, and agriculture. Investigation protocols and guidelines for dealing with new cases are available on the WHO website.

Can the virus be transmitted from person to person?

Yes. We have now seen multiple clusters of cases in which human-to-human transmission has occurred. These clusters have been observed in health-care facilities, among family members and between co-workers. However, the mechanism by which transmission occurred in all of these cases, whether respiratory (e.g. coughing, sneezing) or direct physical contact with the patient or contamination of the environment by the patient, is unknown. Thus far, no sustained community transmission has been observed.

Is there a vaccine or treatment for MERS-CoV?

No. No vaccine is currently available. Treatment is largely supportive and should be based on the patient's clinical condition.

Are health workers at risk from MERS-CoV?

Yes. Transmission has occurred in health-care facilities, including spread from patients to health-care providers. WHO recommends that health-care workers consistently apply appropriate infection prevention and control measures.

on the WEB MERS-CoV infections update (WHO) *www.who.int/csr/disease/coronavirus_infections*

Less than 1 in 5 who have HIV in Middle East receive treatment

WHO moves to expand access to antiretroviral therapy

World AIDS Day was marked on 1 December with events around the world. The World Health Organisation Eastern Mediterranean Regional Office (WHO EMRO) released a statement saying that not even one in five people living with HIV in the Eastern Mediterranean Region and in need of treatment is actually receiving it. Although the number of people living with HIV and receiving antiretroviral therapy (ART) in the Region has increased over the past five years, the number of new infections is increasing at a faster pace.

In addition, the WHO says, most people living with HIV do not know that they have acquired the infection because they have never taken the HIV test.

To address this situation, the WHO launched, on World Aids Day, a new regional campaign to expand access to good quality treatment and care – titled: "Treat More, Treat Better". The campaign which aims to expand access to ART is in line with the global theme: "Getting to Zero: Zero new infections. Zero deaths from AIDS-related illness. Zero discrimination".

Dr Ala Alwan, Regional Director, WHO Eastern Mediterranean Region, said the campaign is "a plea to all of us – governments, civil society groups, technical partners and donors to redouble our efforts to rapidly expand access to good quality HIV treatment and care services".

To Treat More people living with HIV, WHO urges partners to expand access to treatment to ensure that all people who need it actually receive it, regardless of their age, gender, risk behaviour, race or any other reason. There is a need to reach out to those most at risk, and to address stigma and discrimination in healthcare settings. To Treat Better, WHO stresses the need to use more potent, less toxic, and easy-to-take medicines and to ensure better monitoring of patients' response to treatment.

"HIV treatment works," emphasized Dr Alwan. "I am certain that with strong ownership, political will and the right policies and strategies in place, countries can treat more, and treat better."

Lowest HIV treatment coverage in the world

Meanwhile, at the 60th session of the WHO Regional Committee for the Eastern Mediterranean held in Muscat, Oman in October last year, the WHO and the Joint United Nations Programme on HIV/AIDS (UNAIDS) initiated a joint campaign to accelerate HIV testing and treatment coverage in Eastern Mediterranean Region, where, they say, only 15% of the estimated people in need of treatment are receiving it, making it the region with the lowest HIV treatment coverage in the world.

> An estimated 80% of people living with HIV in the region are still not aware that they are carrying HIV.

An advocacy document entitled, "*Accelerating HIV treatment in the WHO Eastern Mediterranean and UNAIDS Middle East and North Africa regions*" was launched at the meeting, which a analyses the regional context and offers a tailored regional framework for a significant scale-up in treatment coverage. It is built on four pillars: creating demand for testing and treatment; investing in sustainable systems for HIV care; delivering results in an equitable manner; and committing to urgent action.

"The treatment crisis in the region is reversible," said Dr Yamina Chakkar, Director UNAIDS-Regional Support Team for the Middle East and North Africa. "We are eager to join forces with our partners and with regional leaders to renew the commitment and bring HIV testing and treatment services to the people who need them."

The region is one of two in the world where new HIV infections are still on the rise. In 2012, 347,000 people in the region were living with HIV, a 127% increase over the number living with HIV in 2001.

The region is one of two in the world where new HIV infections are still on the rise. In 2012, 347,000 people in the region were living with HIV, a 127% increase over the number living with HIV in 2001. However, in other parts of the world antiretroviral therapy has transformed the global HIV response, mitigating the human costs of HIV and playing a vital role in slowing the further spread of the virus.

Across the region, HIV testing and treatment services are available, but several factors limit access for people in need: lack of awareness; fear of stigma and discrimination in families, workplaces, communities and in health care facilities prevent people from taking an HIV test; and seeking care. As a result, an estimated 80% of people living with HIV in the region are still not aware that they are carrying HIV.

The good news is that some countries have achieved considerably higher HIV testing and treatment coverage than the regional average. Countries that have decentralized and integrated HIV service delivery into the health system and engaged civil society and private providers have succeeded in achieving much better coverage than those that have not.

This initiative calls upon leaders to commit to urgent action to increase access to HIV treatment in the region.

"Treatment is fundamental to achieving an AIDS-free generation, in addition to reducing morbidity and mortality, HIV treatment also reduces transmission. We cannot let this opportunity remain untapped. We must do more to garner both the individual and the public health benefits of treatment," emphasized Dr Ala Alwan. MEH

Adolescents falling through gaps in HIV services

More than 2 million adolescents between the ages of 10 and 19 years are living with HIV, and many do not receive the care and support that they need to stay in good health and prevent transmission. In addition, millions more adolescents are at risk of infection.

The failure to support effective and acceptable HIV services for adolescents has resulted in a 50% increase in reported AIDS-related deaths in this group compared with the 30% decline seen in the general population from 2005 to 2012.

Addressing the needs of adolescents

The WHO recommendations "HIV and adolescents: Guidance for HIV testing and counselling and care for adolescents living with HIV" are the first to address the specific needs of adolescents both for those living with HIV as well as those who are at risk of infection.

"Adolescents face difficult and often confusing emotional and social pressures as they grow from children into adults," says Dr Gottfried Hirnschall, director of WHO HIV/AIDS Department. "Adolescents need health services and support, tailored to their needs. They are less likely than adults to be tested for HIV and often need more support than adults to help them maintain care and to stick to treatment."

Across sub-Saharan Africa, many who were infected at birth are becoming adolescents. In addition to the many changes associated with adolescence, they also face the challenges of living with a chronic infection: disclosing the news to friends and family and preventing transmission to sexual partners.

"Adolescent girls, young men who have sex with men, those who inject drugs or are subject to sexual coercion and abuse are at highest risk. They face many barriers, including harsh laws, inequalities, stigma and discrimination which prevent them from accessing services that could test, prevent, and treat HIV," says Craig McClure, Chief of HIV programmes for UNICEF. "About one-seventh of all new HIV infections occur during adolescence. Unless the barriers are removed, the dream of an AIDS-free generation will never be realized."

Making it easier to know HIV status

Furthermore, many young people do not know their HIV status. For example, in sub-Saharan Africa, it is estimated that only 10% of young men and 15% of young women (15-24 years) know their HIV status and, in other regions, although data is scarce, access to HIV testing and counselling by vulnerable adolescents is consistently reported as being very low.

WHO recommends governments review their laws to make it easier for adolescents to obtain HIV testing without needing consent from their parents. The guidelines also suggest ways that health services can improve the quality of care and social support for adolescents. And they highlight the value of involving this age group to create an adolescent-centred approach to the services that work for people of their age.

Better equipping adolescents

"Young people need to be better equipped to manage their HIV infection and take ownership of their health care," says Dr Elizabeth Mason, Director of WHO Maternal, Newborn, Child and Adolescent Health Department. "We have seen for example in Zimbabwe that, by developing adolescent friendly services, it is possible to achieve good treatment outcomes among adolescents. We urge others to be inspired by these examples."

To help health workers put these recommendations into practice WHO has developed a new online tool (to be launched in January 2014). It uses practical examples from country programmes that are working closely with adolescents on HIV issues. MEH

Global health workforce shortage to reach 12.9 million in coming decades

The world will be short of 12.9 million healthcare workers by 2035; today, that figure stands at 7.2 million. A World Health Organization (WHO) report released in November warns that the findings - if not addressed now - will have serious implications for the health of billions of people across all regions of the world.

The report, *A Universal Truth: No health without a workforce*, identifies several key causes. They include an ageing health workforce with staff retiring or leaving for better paid jobs without being replaced, while inversely, not enough young people are entering the profession or being adequately trained. Increasing demands are also being put on the sector from a growing world population with risks of noncommunicable diseases (e.g. cancer, heart disease, stroke etc.) increasing. Internal and international migration of health workers is also exacerbating regional imbalances.

The findings were released at the Third Global Forum on Human Resources for Health together with recommendations on actions to address workforce shortages in the era of universal health coverage. The main recommended actions include:

1. Increased political and technical leadership in countries to support long-term human resource development efforts.
2. Collection of reliable data and strengthening human resource for health databases.
3. Maximizing the role of mid-level and community health workers to make front-line health services more accessible and acceptable.
4. Retention of health workers in countries where the deficits are most acute and greater balancing of the distribution of health workers geographically.
5. Providing mechanisms for the voice, rights and responsibilities of health workers in the development and implementation of policies and strategies towards Universal Health Coverage.

"The foundations for a strong and effective health workforce for the future are being corroded in front of our very eyes by failing to match today's supply of professionals with the demands of tomorrow's populations," says Dr Marie-Paule Kieny, WHO Assistant Director-General for Health Systems and Innovation. "To prevent this happening, we must rethink and improve how we teach, train, deploy and pay health workers so that their impact can widen."

While the report highlights some encouraging developments, for example, more countries have increased their health workforce, progressing towards the basic threshold of 23 skilled health professionals per 10,000 people, there are still 83 countries below this basic threshold. But it is the future projections that raise the loudest alarms. In a stark assessment, the report says the current rate of training of new health professionals is falling well below current and projected demand. The result will be that in the future, the sick will find it even harder to get the essential services they need and preventive services will suffer.

Whilst the largest shortages in numerical terms are expected to be in parts of Asia, it is in sub-Saharan Africa where the shortages will be especially acute. On education and training, for example, in the 47 countries of sub-Saharan Africa, just 168 medical schools exist. Of those countries, 11 have no medical schools, and 24 countries have only one medical school.

"One of the challenges for achieving universal health coverage is ensuring that everyone – especially people in vulnerable communities and remote areas – has access to well-trained, culturally-sensitive and competent health staff," says Dr Carissa Etienne, WHO Regional Director for the Americas. "The best strategy for achieving this is by strengthening multidisciplinary teams at the primary health care level."

Universal Health Coverage aims to ensure that all people obtain the health services they need without suffering financial hardship when paying for them. In the Americas, 70% of countries have enough health care workers to carry out basic health interventions, but those countries still face significant challenges linked to the distribution of professionals, their migration and appropriate training and skills mix.

The foundations for a strong and effective health workforce for the future are being corroded in front of our very eyes by failing to match today's supply of professionals with the demands of tomorrow's populations

"Training of health professionals must be aligned with the health needs of the country," adds Dr Etienne.

All countries are urged to heed the signals of shortages. For example, in developed countries, 40% of nurses will leave health employment in the next decade. With demanding work and relatively low pay, the reality is that many young health workers receive too few incentives to stay in the profession.

The publication also identifies maternal and child health as an urgent health workers' action area. Around 90% of all maternal deaths and 80% of all still births occur in 58 countries, largely because those countries lack trained midwives. Also, of the 6.6 million under-five year olds who died in 2012, most deaths were from treatable and preventable diseases. Again, more health workers would prevent most of those unnecessary young deaths.

The Third Global Forum for Human Resources for Health is the largest event ever held on human resources for health, with more than 1300 participants from 85 countries, including 40 Ministers of Health.

on the WEB A Universal Truth: No health without a workforce
http://tinyurl.com/otx455h

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Global malaria mortality rates down 45%

Global efforts to control and eliminate malaria have saved an estimated 3.3 million lives since 2000, reducing malaria mortality rates by 45% globally and by 49% in Africa, according to the *World malaria report* 2013 published by the World Health Organization (WHO).

An expansion of prevention and control measures has been mirrored by a consistent decline in malaria deaths and illness, despite an increase in the global population at risk of malaria between 2000 and 2012. Increased political commitment and expanded funding have helped to reduce incidence of malaria by 29% globally, and by 31% in Africa.

The large majority of the 3.3 million lives saved between 2000 and 2012 were in the ten countries with the highest malaria burden, and among children aged less than five years – the group most affected by the disease. Over the same period, malaria mortality rates in children in Africa were reduced by an estimated 54%.

But more needs to be done.

"This remarkable progress is no cause for complacency: absolute numbers of malaria cases and deaths are not going down as fast as they could," says Dr Margaret Chan, WHO Director-General. "The fact that so many people are infected and dying from mosquito bites is one of the greatest tragedies of the 21st century."

In 2012, there were an estimated 207 million cases of malaria (uncertainty interval: 135 – 287 million), which caused approximately 627,000 malaria deaths (uncertainty interval 473.000 – 789,000). An estimated 3.4 billion people continue to be at risk of malaria, mostly in Africa and south-east Asia. Around 80% of malaria cases occur in Africa.

Universal access to prevention and treatment

Malaria prevention suffered a setback after its strong build-up between 2005 and 2010. The new WHO report notes a slowdown in the expansion of interventions to control mosquitoes for the second successive year, particularly in providing access to insecticide-treated bed nets. This has been primarily due to lack of funds to procure bed nets in countries that have ongoing malaria transmission.

In sub-Saharan Africa, the proportion of the population with access to an insecticide-treated bed net remained well under 50% in 2013. Only 70 million new bed nets were delivered to malaria-endemic countries in 2012, below the 150 million minimum needed every year to ensure everyone at risk is protected. However, in 2013, about 136 million nets were delivered, and the pipeline for 2014 looks even stronger (approximately 200 million), suggesting that there is real chance for a turnaround.

There was no such setback for malaria diagnostic testing, which has continued to expand in recent years. Between 2010 and 2012, the proportion of people with suspected malaria who received a diagnostic test in the public sector increased from 44% to 64% globally.

Access to WHO-recommended artemisinin-based combination therapies (ACTs) has also increased, with the number of treatment courses delivered to countries rising from 76 million in 2006 to 331 million in 2012.

Despite this progress, millions of people continue to lack access to diagnosis and quality-assured treatment, particularly in countries with weak health systems. The roll-out of preventive therapies – recommended for infants, children under five and pregnant women – has also been slow in recent years.

"To win the fight against malaria we must get the means to prevent and treat the disease to every family who needs it," says Raymond G Chambers, the United Nations Secretary General's Special Envoy for Financing the Health MDGs and for Malaria. "Our collective efforts are not only ending the needless suffering of millions, but are helping families thrive and adding billions of dollars to economies that nations can use in other ways."

This remarkable progress is no cause for complacency: absolute numbers of malaria cases and deaths are not going down as fast as they could. The fact that so many people are infected and dying from mosquito bites is one of the greatest tragedies of the 21st century.

Global funding gap

International funding for malaria control increased from less than US$100 million in 2000 to almost $2 billion in 2012. Domestic funding stood at around $0.5 billion in the same year, bringing the total international and domestic funding committed to malaria control to $2.5 billion in 2012 – less than half the $5.1 billion needed each year to achieve universal access to interventions.

Without adequate and predictable funding, the progress against malaria is also threatened by emerging parasite resistance to artemisinin, the core component of ACTs, and mosquito resistance to insecticides. Artemisinin resistance has been detected in four countries in south-east Asia, and insecticide resistance has been found in at least 64 countries.

"The remarkable gains against malaria are still fragile," says Dr Robert Newman, Director of the WHO Global Malaria Programme. "In the next 10-15 years, the world will need innovative tools and technologies, as well as new strategic approaches to sustain and accelerate progress."

on the WEB World Malaria Report 2013
www.who.int/malaria/publications/world_malaria_report_2013

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Siemens introduces new devices for diagnosis and treatment of cardiovascular diseases

- New cardiac catheter for volumetric intracardiac echocardiography
- Full cardiac MR possible in less than 30 minutes
- New cardiology information system for faster reporting

To support patients, physicians and clinical staff, Siemens has developed products and solutions especially tailored to the diagnosis and treatment of cardiovascular diseases. These include a new cardiac catheter, clinical IT, applications for computed tomography and magnetic resonance imaging and a new system for cardiac molecular imaging. The World Health Organization (WHO) estimates that the number of people dying of cardiovascular diseases will increase to about 23.3 million world-wide by 2030. These diseases, which include coronary heart disease (CHD) and stroke, are already the no. 1 cause of death world-wide. Siemens demonstrated these new products at the European Society of Cardiology (ESC) congress in Amsterdam, the Netherlands, in September last year.

Siemens' intra-cardiac catheter

New intra-cardiac catheter for echocardiography

Siemens is the first to offer real-time volumetric intra-cardiac echocardiography (ICE) with the Acuson AcuNav V ultrasound catheter. Real-time ICE delivers high quality, radiation-free imaging during interventional procedures. The Acuson AcuNav V catheter is particularly useful during transcatheter aortic valve replacement (TAVR) surgery – a high-risk procedure often performed on patients who cannot tolerate the risks and complications associated with general anaesthesia and mechanical ventilation. By using the volumetric ICE catheter, the physician can perform TAVR procedures while the patient is under conscious sedation rather than general anaesthesia. This potentially saves up to two hours in total procedure time and improves patient outcomes with faster recovery. The Acuson AcuNav V catheter is also useful during electrophysiology (EP) ablation procedures.

New release of Acuson SC2000 System with HD transducers

Siemens' high-end Acuson SC2000 ultrasound system enables new abdominal vascular imaging capabilities. The Abdominal Vascular Release of the echocardiography platform is equipped for the first time with a high-density curved array probe – the 6C1 HD. This new feature combines the benefits of HD transducers and IN Focus coherent imaging technology to provide high-quality images with enhanced detail resolution and ease of use in abdominal vascular imaging. In combination with Clarify vascular enhancement (VE) technology, the transducers improve image quality in tissue boundary detection and contrast resolution. The available NTEQ technology automatically and intuitively optimizes the image for easier, more consistent images. Furthermore, new workflow enhancement features are available on the latest version of Acuson SC2000 system. The Trace Assist Tool enables users to easily trace spectral waveforms for quick vascular measurements. The system's workflow applications and automated measurement tools, including eSie Left Heart (LH) measurement package, can now be quickly accessed through the new eSie Access menu.

Shown for the first time at ESC Amsterdam was the improved 4V1c transducer. Featuring a significantly smaller contact area than the previous model, the 4V1c transducer enables easier access to rib spaces for faster exams on difficult-to-image patients.

Full cardiac MRI exam possible in less than 30 minutes

Magnetic resonance imaging of the heart, or cardiac MRI (CMR), supplies detailed information about the morphology and function of the heart. It also provides a visualization of myocardial blood supply, edemas or scar tissue in the context of diagnosing coronary heart disease or various myocardial inflammations.

The Cardiac Dot Engine enables physicians to examine the heart thoroughly in a very short period. It provides standardized clinical examination protocols that are adapted to suit each individual patient to shorten the examination time. This includes breathing tests, pulse monitoring, planning the examination and adjusting the volume of contrast agent to the patient's weight and age. The standardized examination protocols make the results highly reproducible. This means that a full heart examination can be performed in less than 30 minutes, compared to the usual hour. The AutoAlign Heart expansion in the new version of the Cardiac Dot Engine plans diagnostically relevant sectional planes through the longitudinal axis of the heart fully automatically.

To enable efficient diagnosis of vascular diseases based on MR angiography datasets, Syngo.via offers the new application Syngo.MR Vascular Analysis. It enables physicians to identify vascular diseases such as stenoses, automatically quantify the vascular changes and thus diagnose them swiftly and efficiently, with just three clicks of the mouse.

CT scanner software improves accuracy for TAVI procedures

Computed tomography provides support for minimally invasive Transcatheter Aortic Valve Implantation (TAVI). Siemens Healthcare has developed new software that helps physicians determine the right valve size for the patient and establish the precise angle at which the new valve must be inserted even before the intervention in the cardiac catheterization laboratory. This saves time and reduces the dose of contrast agent required for the patient during the intervention, since the important information is already available.

To select an appropriate artificial heart valve, the physician must determine the precise dimensions of the target location, the aortic annulus. This elliptical structure was previously measured manually using ultrasound, which was subject to an elevated risk of error. The Syngo CT Cardiac Function – Valve Pilot application, in combination with 3-D CT imaging, automatically detects the annulus plane and determines the precise measurements of the annulus as the case is opened. The cardiologist can then select the correct size for the implant. This further establishes TAVI as a lower-risk alternative to open thoracic surgery. The combination with the Somatom Definition Flash scanner offers a further major benefit for older and weaker patients in particular. They often suffer from impaired renal function and may experience renal failure in a worst-case scenario if relatively large doses of contrast agent are used. With the Somatom Definition Flash, a scan using only 40 ml of contrast agent is enough to provide the cardiologist with all necessary information.

Traditional scanners may require more than one scan and up to 150 ml of contrast agent. Contrast agent can also be saved by using preliminary CT examinations when determining the approach angle. If the cardiologist has the information needed to determine the best angle before surgery in the cardiac catheterization laboratory, less contrast agent has to be injected to find the correct annulus plane. The Syngo CT Cardiac Function - Valve Pilot application offers a further advantage here, since it automatically determines the ideal angle, which can be transferred directly to the catheterization laboratory.

New cardiology information system for faster workflow

A new version of the Syngo Dynamics cardiology information system supports physicians in streamlining the workflow and making improvements in clinical use. Whereas a report previously had to be fully completed before another user could access it, Syngo Dynamics now allows numerous users to call up the documentation on a single study simultaneously. This means that physicians, medical staff and technicians can work more effectively together, which benefits the patient, since reports can now be completed more quickly than was previously the case. Users now have access to new, additional documentation options that cover the entire reporting process, e.g. earlier studies. This saves a step in the process.

As soon as the documentation is completed, improvements included in the new version of the software ensure that reports can be completed in a shorter time than before. Using Syngo Dynamics also permits physicians to better monitor the radiation dose. It thus warns physicians automatically about excessive doses when they are planning an examination.

The new "Automatic Study List" feature from Syngo Dynamics helps draw up reports more quickly. Physicians can thus navigate through the clinically relevant information to complete their reports. A simple dropdown menu replaces the need to call up patient data and older additional information one item at a time.

New system for molecular imaging

Myocardial perfusion scintigraphy is a typical exam in the field of molecular imaging. Questions such as 'How healthy is the heart tissue?' and 'How efficiently it is pumping blood to the rest of the body?' are crucial here. The new positron emission tomography/computed tomography (PET/CT) scanner, Biograph mCT Flow, comes with two features to support cardiovascular care.

Siemens' Biograph mCT Flow

The feature HD-Cardiac enables physicians – for the first time – to correct for both respiratory and cardiac motion in the heart using single-trigger dual gating. HD-Cardiac relies on an electrocardiography (ECG) lead to account for the heart motion, while software using a special extraction algorithm developed by Siemens, searches the scan data for waves created by respiratory motion and corrects it to account for lung movement motion without the use of a second trigger. The result is reduced respiratory motion blur, which can provide physicians with improved visualization of myocardial tracer distribution, wall thickness and defect definition over non-respiratory motion corrected images.

The feature One-Click phase-matched gating provides automatic accurate phase registration and quantification of PET and CT cardiac phases. This software aligns and synchronizes PET and CT images with just one click even when animated. MEH

Trinity Biotech enters cardiac diagnostics with Meritas Troponin I, a novel guideline-compliant point-of-care test

Trinity Biotech, headquartered in Bray, Ireland, specializes in the development, manufacture and marketing of diagnostic instrumentation and test kits for the clinical laboratory and point-of-care (POC) environments in the areas of infectious disease, autoimmunity, haemoglobin disorders and diabetes. Founded in 1992, Trinity Biotech has combined strong organic growth with a progressive acquisition-led strategy to become a world leader in the international diagnostics industry. This success has been due to the consistent, excellent quality of its now more than 400 products, which are ISO 13485:2003, ISO 9001:2008, FDA and WHO approved.

Following the acquisition of the forward-thinking Swedish company Fiomi Diagnostics in early 2012, Trinity Biotech has recently entered the field of cardiac diagnostics. Fiomi Diagnostics has been dedicated to the development of accurate and precise cardiac biomarker tests since its inception. Building on the combined talents of the two companies, Trinity Biotech embarked on a mission to create a unique suite of products that would herald a new era in cardiac diagnostics.

Historically, there has been a lack of reliable testing at the point of patient care, and acute care clinicians worldwide recognize the urgent need for laboratory standard POC testing to ensure ▶

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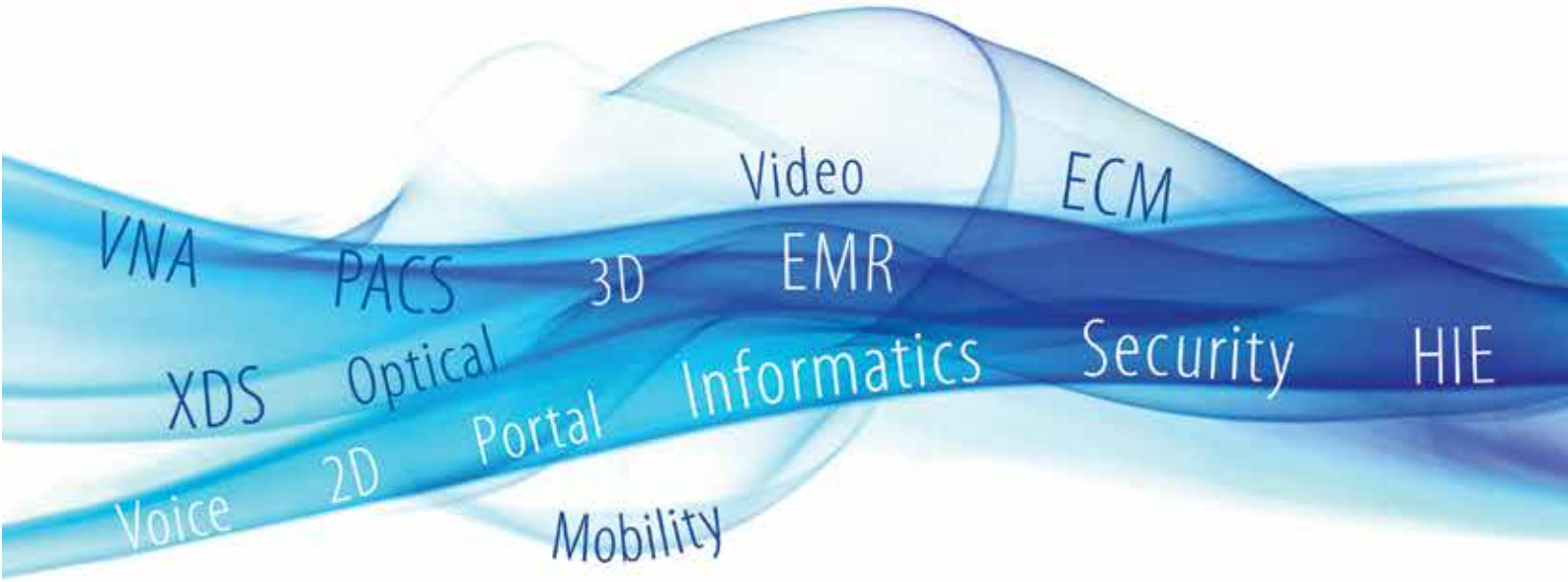

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the quality, reliability and accuracy of results. Using its diagnostic instrument expertise, Trinity Biotech's entrepreneurial team has solved this long-standing problem by creating Meritas, a stateof-the-art analyzer that signals a new dawn in reliable, accurate point-of-care testing.

The groundbreaking Meritas POC Analyzer sets a new standard for point-of-care testing. Its test menu includes the pioneering Meritas Troponin I test; the only high sensitivity, ESC, ACC, and AHA guideline-compliant troponin assay to offer true point-of-care capability. The Meritas Troponin I test allows rapid, cost-effective and accurate triage of patients presenting at the emergency department with a possible myocardial infarction (MI), enabling earlier diagnosis and timely initiation of the correct treatment or, when an MI is ruled out, allowing the patient to be safely discharged.

The Meritas Troponin I test is a single use, rapid fluorescence immunoassay for *in vitro* quantitative determination of Troponin I in human whole blood and plasma. The straightforward, one-step assay simply requires the insertion of a sample test cartridge into the analyzer. Each cartridge is preprogrammed with a lot number, calibration curve and expiry date – eliminating the need for manual transcription with its associated potential for errors – and all results are traceable to the NIST SRM 2921 international standard, with built-in QC checks to ensure comparable data to top performing laboratory analyzers.

The Meritas POC Analyzer's intuitive graphical user interface guides the operator effortlessly through performing the test, generating results in just 15 minutes. This rapid time-to-results helps to improve patient management and outcomes by minimizing unnecessary admissions and inappropriate discharge of patients, generating significant cost savings through optimal use of precious hospital resources.

Tom Parenteau, Vice President of Cardiovascular Products at Trinity Biotech, commented: "Precise, accurate POC testing is essential to avoid the false positive results that lead to unnecessary admissions, tying up precious hospital beds, as well as false negatives that can result in inappropriate discharge of sick patients. The revolutionary Meritas is a tremendous asset to the POC environment, offering top quality laboratory performance with all the known benefits of point-of-care testing."

● For more information, visit *www.meritaspoc.com*

High-intensity exercise for people with heart disease – is higher better?

High-intensity exercise is shown to be protective against coronary heart disease (CHD) and is well known as a popular and time-saving approach to getting fit. But what about people who already have heart disease? Previously, these patients were told to exercise, but only at a moderate intensity to protect their hearts. More recently, however, researchers have found that high-intensity exercise is very beneficial for these patients. But how intense should these sessions actually be?

A new study from the K. G. Jebsen – Center of Exercise in Medicine at the Norwegian University of Science and Technology (NTNU) in Trondheim, Norway examines this question in detail. Researchers analysed data from four randomized, controlled trials conducted at the center to try to determine what characterized the most effective high-intensity training programme for this patient group.

The researchers used changes in VO-2max, which is peak oxygen uptake, as a measure of the effectiveness of the different exercise regimes. The study participants (n=112) were aged 18+ and all had coronary heart disease. The exercise period lasted for 12 weeks. The participants either ran/walked on a treadmill, walked uphill outdoors or trained in a group, all following the 4x4 exercise model. The 4x4 exercise model involves 4 minutes of high-intensity exercise followed by 3 minutes of moderate-intensity exercise, repeated 4 times.

Interval intensity important

"When we compared VO2max before and after the training period, we found that the number of training sessions, the subject's age or baseline fitness levels had no impact," says Trine Moholdt, a postdoctoral fellow at the center and lead author of the study. "But the intensity of the intervals had a significant effect, and seems to be the most important characteristic of an effective interval session."

The intensity of the training was categorized according to the participant's heart rate zone (% of maximum heart rate (HRmax)). High-intensity training is when an individual's HR during intensive periods is 85-95% of HRmax.

Overall, VO2max increased by 11.9 % after an average of 23.4 training sessions during the 12-week period for all subjects. However, when participants exercised at an intensity that was greater than 92 % of their HRmax during the high-intensity periods, the effect was even greater than at the lower intensity levels, indicating that there is a dose-response relationship even in the 85-95% high-intensity zone.

Answering practical questions

Moholdt says that people who start exercising using interval training often have lots of practical questions. How much incline should their treadmill have? Can they shorten their lower-intensity time to just 2 minutes? Why 4 minutes and not 5?

"Knowing that pushing yourself to over 90 % of HRmax may save you from an extra training session that week encourages us to investigate even the small details," says Moholdt. "When people give priority to exercise in their otherwise busy lives, they want to know that they are doing it the right way. At the same time, I want to emphasize that all exercise is better than none! Some people are not able to exercise at high intensity because of other health problems, and one should then look for other alternatives."

The four studies, which were composed of patients who either had acute coronary syndrome or angina pectoris, confirmed previous findings that high-intensity exercise is safe, even for patients with CHD. Moholdt says it would be interesting to see if these finding hold true for healthy subjects, as well as for patients with more severe heart disease.

● **doi:**10.1016/j.jsams.2013.07.007 MEH

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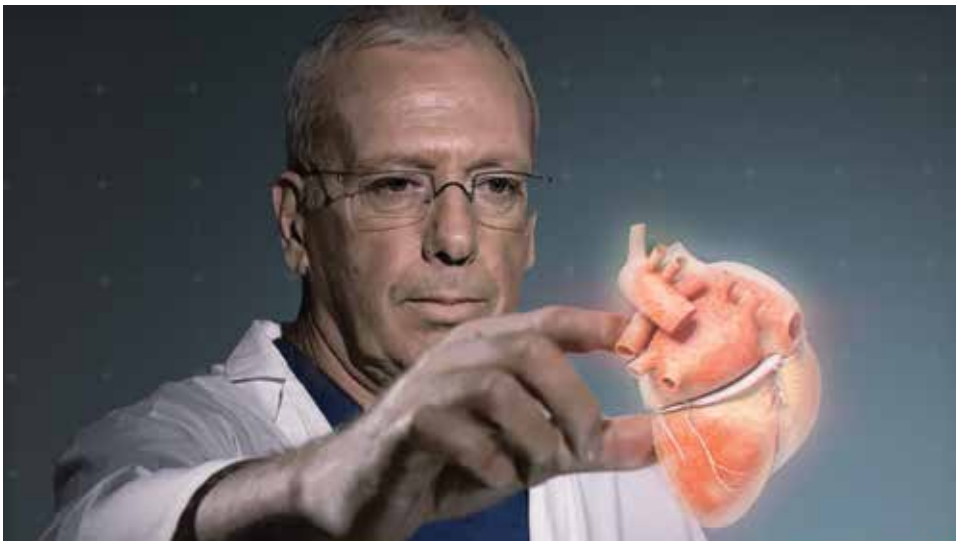

In the pilot study, clinicians were able to manipulate the projected 3D heart structures by literally touching the holographic volumes in front of them.

3D holographic visualization used to guide minimally-invasive heart disease procedures

Philips Healthcare recently announced that they have completed a clinical study that has demonstrated the feasibility of using an innovative live 3D holographic visualization and interaction technology to guide minimally-invasive structural heart disease procedures. In the pilot study that involved eight patients and was conducted in collaboration with the Schneider Children's Medical Center in Petach Tikva, Israel, RealView's innovative visualization technology was used to display interactive, real-time 3D holographic images acquired by Philips' interventional X-ray and cardiac ultrasound systems.

In addition to viewing the patient's heart on a 2D screen, doctors in the interventional team were able to view detailed dynamic 3D holographic images of the heart 'floating in free space' during a minimally-invasive structural heart disease procedure, without using special eyewear. The doctors were also able to manipulate the projected 3D heart structures by literally touching the holographic volumes in front of them. The study demonstrated the potential of the technology to enhance the context and guidance of structural heart repairs.

"The holographic projections enabled me to intuitively understand and interrogate the 3D spatial anatomy of the patient's heart, as well as to navigate and appreciate the device-tissue interaction during the procedure," said Dr. Einat Birk, pediatric cardiologist and Director of the Institute of Pediatric Cardiology at Schneider Children's Medical Center.

Dr. Elchanan Bruckheimer, pediatric cardiologist and Director of the Cardiac Catheterization Laboratories at Schneider Children's Medical Center, added: "The ability to reach into the image and apply markings on the soft tissue anatomy in the X-ray and 3D ultrasound images would be extremely useful for guidance of these complex procedures."

Bert van Meurs, General Manager of Integrated Clinical Solutions and Marketing for Imaging Systems at Philips Healthcare, said: "Our ultimate goal is to create the future of healthcare by delivering innovative solutions that enhance clinical capabilities and improve patient outcomes. By teaming up with partners that share our passion for innovation, we have been able to demonstrate the feasibility and potential value of the world's first holographic visualization technology targeted at guiding minimally invasive cardiac procedures."

Aviad Kaufman, CEO of RealView Imaging Ltd, commented: "I see clear indications that 3D medical holography will play an important role in medical imaging in the near future. With the advancement of live 3D imaging and increasing clinical evidence of its value for a variety of procedures, we are convinced that our holographic technology will further enhance 3D imaging and, most importantly, improve patient care."

Progress in image-guided therapies for heart diseases – from the opening of obstructed coronary arteries to catheter ablation therapy for heart arrhythmias and catheter-based structural heart repairs (for example, heart valve replacements) – have greatly increased the need for live 3D image guidance, to supplement today's live 2D image guidance. Live X-ray and live 3D cardiac ultrasound imaging are typically used simultaneously to guide minimally invasive structural heart repair procedures, with the ultrasound images providing detailed insights into the heart's soft tissue anatomy, and the X-ray imaging providing visualization of catheters and heart implants.

The technological advancements in the acquisition of live 3D images to guide minimally invasive procedures have also triggered the development of novel ways to visualize the data. Following the promising results produced by this pilot study, Philips and RealView Imaging will continue to explore the clinical value of combining live 3D imaging and medical holography, both in interventional cardiology and in other clinical areas. MEH

Researchers show how a modified pacemaker strengthens failing hearts

Johns Hopkins heart researchers are unravelling the mystery of how a modified pacemaker used to treat many patients with heart failure, known as cardiac resynchronization therapy (CRT), is able to strengthen the heart muscle while making it beat in a coordinated fashion. In a new study conducted on animal heart cells described in the *Journal of Clinical Investigation*, the scientists show that CRT changes these cells so they can contract more forcefully. The researchers also identified an enzyme that mimics this effect of CRT without use of the device.

"These discoveries potentially give us new pathways to benefit more heart failure patients – not only those whose hearts beat out of sync, but also those who currently do not qualify for CRT therapy yet still need an effective treatment to help their heart pump stronger," says David Kass, M.D., professor of medicine and biomedical engineering at the Johns Hopkins University School of Medicine and senior author of the study. "Understanding the inner workings of CRT at the biological level may lead, in essence, to a 'pacemaker in a bottle'."

The researchers say their ultimate goals are to develop drugs or genetic therapies that strengthen failing hearts and to design a test to identify patients who would be most likely to benefit from CRT.

Prof Kass explains that while the typical implanted pacemaker has only one wire that stimulates the right side of the heart, the CRT pacemaker has two wires. The second wire goes to the surface of the left side of the heart to enable both sides of the heart to be stimulated together.

CRT helps people whose hearts beat out of sync – one side is activated to "beat" before the other, preventing the muscle from pumping blood evenly. This condition is known as dyssynchrony. CRT "paces" the rhythms of both sides to restore a coordinated beat.

In their experiments, the researchers used an animal model of heart failure with dyssynchrony and also examined the impact of CRT on the heart. By studying isolated muscle tissue and muscle cells, they examined the relationship between contraction and the calcium that triggers it. In the hearts that beat out of sync, force from the muscle cells and the level of calcium needed to generate contractions were very much reduced. CRT improved contraction force more than calcium, and this led to the discovery that CRT had increased the sensitivity of the muscle to calcium.

The next question was how this change had occurred. Calcium sensitivity is a property of the proteins that form the contracting "engine" of muscle, so the investigators examined how these proteins had been biochemically altered by CRT. After ruling out all the known ways this might have occurred, they turned to a newer approach, testing for changes in more than 150 proteins and discovered that CRT specifically modified 13 of them.

"Once we discovered which proteins were being altered, we were able to identify an enzyme likely responsible for these changes," noted lead author Jonathan Kirk, Ph.D., a post-doctoral fellow at the Johns Hopkins University School of Medicine. Working with heart muscle and isolated cells from the same animal models, the researchers found that the enzyme turned out to be GSK-3 beta, which was able to convert the behaviour of muscle cells from a heart that was beating out of sync to what looked like heart cells that had received CRT, essentially mimicking the effect of CRT.

In further lab experiments, Prof Kass and his colleagues found that although GSK-3 beta was inactive in muscle from a failing and dyssynchronous heart, it was reactivated by CRT. When that happened, the enzyme altered the motor proteins so that they generated greater force using the same amount of calcium-based activation.

> These discoveries potentially give us new pathways to benefit more heart failure patients.

"It had never been shown before that GSK-3 beta could modify motor proteins in the heart to make them more sensitive to calcium. It is surprising that this same type of effect can be produced by a pacemaker therapy like CRT," says Prof Kass.

Nearly all existing medications for heart failure increase heart contraction by enhancing levels of calcium available to muscle cells, but over time, these higher levels can be toxic to the heart.

Altering the calcium sensitivity of the muscle is not the only way CRT can improve heart function. In a study published in 2011, Prof Kass and colleagues also showed that CRT enables heart muscle to respond to hormones, such as adrenaline, which stimulates pumping ability, in a similar way to what happens during exercise.

The Kass Lab played a key role in developing CRT for use in patients in the late 1990s. The US Food and Drug Administration approved CRT in 2001, and it is widely used today to improve symptoms and help people live longer.

In an unusual twist to the way therapies are usually developed, CRT was first tested in patients, but the biological mechanisms as to why it worked were not understood. The new work is running the discovery clock backwards, revealing these mechanisms and their potential to benefit many patients with heart failure.

doi:10.1172/JCI69253 MEH

Valve repair or replacement offers similar outcomes for severe heart valve disease

Study provides first rigorous comparison of these two surgical options for leaky mitral valves

Repair or replace? Consumers often ask this question when considering faulty cars, appliances, or other equipment. A new clinical study has now addressed this question for a serious medical decision: how to treat ischemic mitral regurgitation (IMR), a condition in which blood backflows into the heart because the mitral valve becomes leaky after a heart attack. The study compared the two surgical options – re-tightening the leaky mitral valve or replacing it with a prosthetic – and found no significant differences in patient outcomes after a year.

This was the first randomized clinical trial comparing these two approaches for IMR. It was carried out by the Cardiothoracic Surgical Trials Network (CTSN), a consortium supported by the US National Heart, Lung, and Blood Institute (NHLBI) and the US National Institute of Neurological Disorders and Stroke (NINDS) of the US National Institute of Health, along with the Canadian Institutes of Health Research (CIHR).

"This study addressed an important question for a clinically vulnerable patient group," said Michael Lauer, M.D., director of NHLBI's Division of Cardiovascular Sciences. "People who have ischemic mitral regurgitation not only have bad valves, they have bad hearts. It's critical we know the right procedure for these patients."

Although the CTSN study did not find differences in health outcomes, the results still provide implications for surgeons, noted CTSN investigator Michael Acker, M.D., of the University of Pennsylvania Perelman School of Medicine, Philadelphia, who will present the results at the American Heart Association (AHA) Scientific Sessions in Dallas. "The medical community has recently gravitated towards valve repair as a preferred treatment option for IMR. The evidence this study presents does not suggest mitral valve repair is superior."

The results of the Severe Mitral Regurgitation (SMR) trial will be published November 18, 2013 in the *New England Journal of Medicine*.

People who have ischemic mitral regurgitation not only have bad valves, they have bad hearts. It's critical we know the right procedure for these patients.

IMR affects over 1 million people in the United States and can pose serious health consequences. The leaky valve, by forcing the heart to pump some blood backward, makes the heart work harder, which can eventually lead to heart failure, stroke, or sudden cardiac arrest. In severe cases, repairing or replacing the mitral valve is necessary. Both approaches offer benefits and risks, but as of yet no study has rigorously evaluated these approaches to see if the trade-offs result in significant differences in patient outcomes.

The SMR study enrolled 251 patients who had been diagnosed with severe IMR. These patients were then evenly randomized to receive surgical repair (a valve tightening procedure called an annuloplasty) or a prosthetic replacement mitral valve.

The participants were then monitored at one, six and 12 months after their procedure. The investigators examined how well the surgery worked by measuring the shrinkage of the heart's left ventricle, which enlarges with chronic valve leakage. The study also measured various health outcomes as well as patient-assessed quality of life.

After a year of follow-up, there were almost no differences in ventricle shrinkage or health outcomes between the two treatments. The only significant change was a higher rate of recurrent regurgitation in the repair group (32.6% of repair patients versus 2.3% of replacement patients).

"The increased level of recurrent regurgitation falls in line with valve replacement offering more durable long-term protection," noted Annetine Gelijns, Ph.D., CTSN investigator at the Icahn School of Medicine at Mount Sinai in New York City, and corresponding author of the study. "However, such regurgitation did not lead to any noticeable increases of health problems among patients in the repair group."

Gelijns said the SMR study will continue to monitor the participants until they reach 24 months post-procedure, to see if long-term differences emerge, which may help identify patient groups better suited for repair or replacement. MEH

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'Virtual heart' helps guide defibrillator placement in children with heart disease

The small size and abnormal anatomy of children born with heart defects often force doctors to place lifesaving defibrillators entirely outside the heart, rather than partly inside – a less-than-ideal solution to dangerous heart rhythms that involves a degree of guesstimating and can compromise therapy.

Now, by marrying simple MRI images with sophisticated computer analysis, a team of Johns Hopkins researchers says it may be possible to take the guesswork out of the process by using a virtual 3-D heart model that analyzes a child's unique anatomy and pinpoints the best location for the device before it is implanted.

A description of the team's work is published in *The Journal of Physiology*.

"Pediatric cardiologists have long sought a way to optimize device placement in this group of cardiac patients, and we believe our model does just that," says lead investigator Natalia Trayanova, Ph.D., the Murray B. Sachs Professor of Biomedical Engineering at Johns Hopkins. "It is a critical first step toward bringing computational analysis to the pediatric cardiology clinic."

If further studies show the model has value in patients, it could spare many children with heart disease from repeat procedures that are sometimes needed to re-position the device, says co-investigator Jane Crosson, M.D., a pediatric cardiologist and arrhythmia specialist at the Johns Hopkins Children's Center.

"It's like having a virtual electrophysiology lab where we can predict best outcomes before we even touch the patient," Dr Crosson says.

In adults and in children with normal size and heart anatomy, one part of the device lies under the collar bone, while the other end is inserted into one of the heart's chambers, a standard and well-tested configuration. But in children with tiny or malformed hearts, the entire device has to be positioned externally, an often imperfect setup. Such less-than-precisely positioned defibrillators can fire unnecessarily or, worse, fail to fire when needed to shock a child's heart back into normal rhythm, experts say. In addition, devices that are not positioned well can pack a punch, delivering ultra-strong, painful jolts that frighten children and could even damage heart cells.

"These are lifesaving devices, but they can feel like a horse kick to the chest and really traumatize children," Dr Crosson says.

With the Johns Hopkins heart model, scientists say they can find exactly where in relation to a patient's heart the device would be best able to reset the heart by using the least amount of energy and gentlest shock. This translates into longer battery life for the device as well, Prof Trayanova says.

To build the model, the Johns Hopkins team started out with simple, low-resolution MRI heart scans of a child born without a tricuspid valve and right ventricle. Based on these images, the researchers developed a 3-D computer model that allowed them to simulate a dangerous rhythm disturbance during which the heart's strong, regular beats degenerate into weak quivers that, if uninterrupted, could kill in minutes. The model predicted how effectively the defibrillator would terminate this dangerous rhythm when located in each one of 11 positions around the heart. Based on the model, the scientists determined that two particular positions rendered therapy optimal.

These are lifesaving devices, but they can feel like a horse kick to the chest and really traumatize children.

A particular advantage of the model is its true-to-life complexity. The model was built using digital representations of the heart's subcellular, cellular, muscular and connective structures – from ions and cardiac proteins to muscle fibre and tissue. The computer model also included the bones, fat and lungs that surround the heart.

"Heart function is astounding in its complexity and person-to-person variability, and subtle shifts in how one protein interacts with another may have profound consequences on its pumping and electric function," Prof Trayanova says. "We wanted to capture that level of specificity to ensure predictive accuracy."

Prof Trayanova and her team also have designed image-based models that pinpoint arrhythmia-triggering hot spots in the adult heart muscle and can help guide therapeutic ablation of such areas. The new pediatric virtual heart, however, is the team's first foray into pediatric cardiology. MEH

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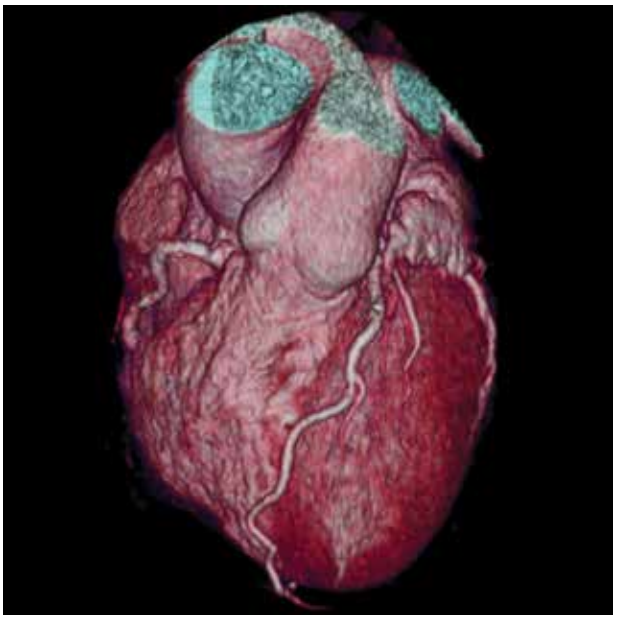


GE Healthcare's Revolution CT scans the heart in one beat with high definition, motion free imaging and low dose radiation (80kV / 500mA / 0.28sec rotation / BMI 23 / 55 bpm / 0.9mSv)

GE Healthcare's new, ultra-fast CT scanner freezes the heart's motion in one beat without sacrificing image quality

GE Healthcare, announced at the RSNA in Chicago in November, that its 510(k)-pending Revolution CT has captured a motion free image of the human heart in just one beat.

This innovative technology enables clinicians to non-invasively visualize the human heart more clearly than ever before, and diagnose more patients with erratic or high heart beats.

According to published literature (the *British Journal of Radiology*), more than 60% of patients referred to cardiac CT were found to have heart rates higher than 60 beats per minute, and some are turned away from being scanned. With Revolution CT, clinicians can clearly see specific areas of the heart that were previously compromised either by a patient's movement, high heart rate, or a child's inability to hold his or her breath.

The images were captured by Dr. Ricardo C. Cury, chairman of Radiology and director of Cardiac Imaging at Baptist Health South Florida. According to Dr Cury, physicians no longer will be forced to choose between CT systems with wide coverage, high spatial resolution (clear image), or high temporal resolution (speed). For the first time, GE Healthcare's Revolution CT converges these three technological advances into one CT system.

"This is innovation at its best and is really an all-in-one scanner," said Dr Cury. "Diagnostic quality images are now possible in challenging patients like those with high heart rates, which is a significant advancement. The impressive ability of Revolution to combine coverage, spatial and temporal resolution in a single scanner will translate to many clinical applications and potentially new applications in the future." Investigational clinical images to demonstrate the capabilities of the scanner were obtained in collaboration with West Kendall Baptist Hospital (WKBH). Dr. Cury served as principal investigator for this study.

In a cost-constrained healthcare environment, clinicians need one definitive test that gives them the diagnostic confidence to make the right treatment decision for their patients. GE Healthcare's Revolu-

tion CT makes this possible through the convergence of spatial resolution, temporal resolution, coverage, and low dose all-in-one, providing uncompromised image quality and clinical capabilities.

Clinical exams

This convergence enables the following advanced clinical exams:

- Comprehensive cardiac exams with anatomic and functional information in just one heartbeat, even with challenging patients and higher heart rates
- Rapid, whole-brain stroke assessment at low dose
- Dynamic liver, kidney, or pancreas oncology workup personalized with perfusion and vascular flow analysis.

The Revolution CT's technological advances include the 16 cm Gemstone Clarity detector for whole organ coverage, best-in-class spatial resolution at 230 microns for visualizing small anatomy, and a 0.28 second gantry designed and tested for up to 0.2 sec rotation speed. Combined with SnapShot Freeze motion correction technology, the system delivers 24 msec effective temporal resolution for high heart rate imaging without restrictions.

The Revolution CT continues GE's commitment to lower CT doses, with innovations such as the new Gemstone Clarity detector, a dedicated 70kVp scan mode for pediatric use, and ASiR-V, GE's next generation of iterative reconstruction technology.

For the patient, the system provides a wider, more comfortable 80cm bore and a quiet scanning experience with the new Whisper Drive system. Ultra-fast scanning with streamlined workflow makes it a perfect scanner for emergency rooms.

Revolution CT will be easier to use as GE Healthcare is also introducing a revolutionary new user interface based on inputs from hundreds of clinicians and technologists around the world. With Revolution, advanced imaging will now be routine, and routine imaging more advanced.

> This will be the first CT scanner that's right for everybody in every clinical specialty.

"This will be the first CT scanner that's right for everybody in every clinical specialty," said Steve Gray, president and CEO of MICT & AW for GE Healthcare. "Revolution CT is able to scan even the most challenging patients, day in and day out, with remarkably clear images. And, we made sure that using it is productive, logical, and intuitive." MEH

Siemens' new Symbia Intevo fully integrates SPECT and CT data for the first time

Siemens Healthcare recently introduced Symbia Intevo, the first system to fully integrate single-photon emission computed tomography (SPECT) and computed tomography (CT), thus leveraging the high resolution of CT to enable more accurate lesion characterization and early treatment follow-up. Symbia Intevo is the world's first xSPECT system, a new modality that integrates the full data sets of both SPECT and CT. The resulting level of detail helps differentiate clinical conditions more precisely, for instance distinguishing degenerative bone loss from malignant disease. For the first time, Symbia Intevo provides quantitative images for more reliable monitoring and evaluation of treatment response.

Symbia Intevo, the world's first xSPECT system, is a new modality that integrates the full data sets of both SPECT and CT. The resulting level of detail helps differentiate clinical conditions more precisely, for instance distinguishing degenerative bone loss from malignant disease.

Until now, SPECT/CT has been based on separate reconstruction of the SPECT and CT images that are then mechanically fused. Those SPECT/CT images are inherently blurry because they result from compromise: The high-resolution CT images must be reduced to the low-fidelity frame of reference of the SPECT image. While this method enables basic anatomical localization of disease, the inherent misalignment of SPECT and CT limits a physician's ability to characterize and follow ▶

disease. Historically, physicians have used the CT images for localization and the SPECT images to indicate metabolic activity, intuitively correcting the localization of SPECT images with the CT information.

Siemens' new Symbia Intevo xSPECT system reduces the need for this "correction in the mind's eye" with its new technology that uses CT as the frame of reference instead of SPECT, enabling full integration of SPECT and CT data. This method is built on new hardware and an iterative reconstruction algorithm that accounts for detector motion, gantry deflections, the sizes and shapes of collimator holes, and the distance of the patient from the detectors. The raw data from SPECT and CT acquisitions are processed using a state-of-the-art, 64-bit computer, which allows high-resolution image reconstruction.

The xSPECT modality deploys advanced algorithms that leverage the attenuation coefficients[1] to index each voxel[2] into one of five classes: air, adipose, soft tissue, spongious bone and cortical bone. These provide the basis for a patient-specific linear attenuation map that can especially improve the resolution of bone images, which is very challenging for conventional SPECT/CTs. That way, xSPECT images show excellent delineation between bone and soft tissue and the lesions present within, which aids the physician to distinguish between cancerous lesions and degenerative disorders.

The precise alignment of SPECT and CT data with xSPECT also enables tracer absolute quantification, which was only possible with PET/CT before. Quantification of tracer uptake provides a numerical indication of a tumour's level of metabolic activity. With the xSPECT Quant feature, the physician can apply this quantitative information as an aid in assessing a patient's response to therapy over time.

While Symbia Intevo uses more CT data than ever before, Siemens is still able to limit patient dose by offering combined applications to reduce exposure (CARE). Unique to Siemens, these applications include the CARE Dose4D technique, which can reduce patient CT radiation dose by up to 68%.

1 Indication of the level of absorption and scattering of the radiation beam when passing a given material.
2 Data element in a 3D image. MEH

Philips introduces digital PET/CT system and Spectral CT system

Philips Healthcare's new Vereos PET/CT

At the RSNA in Chicago in November, Philips Healthcare introduced two fundamentally new developments: its Vereos PET/CT fully digital positron emission tomography/computed tomography (PET/CT) imaging system, and its IQon Spectral CT spectral detector-based computed tomography (CT) imaging system.

These new innovations further expand Philips' integrated radiology product.

"We work closely with radiologists to understand their biggest challenges, and incorporate these understandings in the development of innovative products like Vereos PET/CT and IQon Spectral CT to meet their complex imaging needs," said Gene Saragnese, CEO, Imaging Systems at Philips Healthcare. "These innovations demonstrate how Philips is providing radiologists with exceptional quality and accuracy in imaging at low dose rates, helping clinicians to get answers, the first time around, so that they can deliver accurate and more confident diagnoses to patients."

"The timing and precision of disease diagnosis are critical to the successful treatment of many diseases," commented Pablo Ros, M.D., Chairman of the Department of Radiology, University Hospitals Case Medical Center and Case Western Reserve University, Cleveland, Ohio. "With that in mind, we are excited to have contributed to the development of Philips' Vereos digital PET/CT and IQon Spectral CT systems and we will continue to collaborate with Philips to realize the potential of these next generation imaging systems."

Vereos PET/CT

PET scans are three-dimensional images that provide insight into what is happening inside the body at the molecular and cellular level. A small amount of radiotracer is injected into the patient prior to the exam, which accumulates in the body's tissue and organs, and decays. The PET detector captures pairs of photons that are emitted from the body during this decay process and forms the image. Based on Philips' proprietary 'Digital Photon Counting' technology, the Vereos PET/CT is the first PET/CT system in the industry to use innovative digital silicon photomultiplier detectors instead of traditional analog detectors, resulting in a step change in performance that includes an approximately two-times increase in sensitivity gain, volumetric resolution and quantitative accuracy compared to analog systems. These radical improvements can ultimately be

translated into high image quality, increased diagnostic confidence, improved treatment planning and faster workflows.

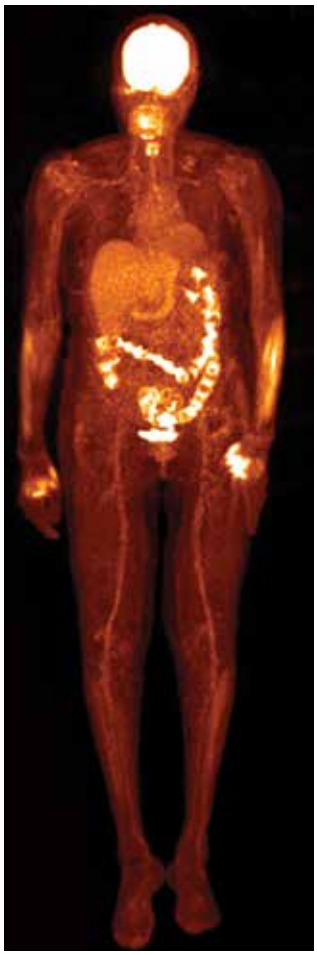
"Personalized medicine will require a patient-specific picture of the functional processes associated with disease," added Pablo Ros, M.D. "Accurate quantification of processes is therefore an important requirement for functional imaging in diagnosis, therapy and research. The quantitative accuracy and remarkably clear images that the new digital PET/CT system delivers are a key step forward."

Philips has received 510(k) clearance from the U.S. Food and Drug Administration (FDA) to market its digital PET/CT system in the U.S.

IQon Spectral CT

Philips' second RSNA introduction – its IQon Spectral CT system – is the world's first spectral-detector CT system built from the ground up for spectral imaging. It uses colour to identify the composition of an image without involving time-consuming protocols. In the same way that white light is made up of a spectrum of colours, the X-ray beam used in CT scanners also consists of a spectrum of X-ray energies. With the development of a fundamentally new spectral detector that can discriminate between X-ray photons of multiple high and low energies simultaneously, Philips' IQon Spectral CT adds a new dimension to CT imaging, delivering not only anatomical information but also the ability to characterize structures based on their material makeup within a single scan.

After a spectral CT examination, clinicians can interpret the conventional grey-scale anatomical images, and if necessary, access the spectral information that was acquired during the same scan. The IQon Spectral CT system's retrospective on-demand data analysis is made possible via Philips' iPatient platform, allowing clinicians to easily experience the benefits of spectral CT routinely within traditional radiology workflows. MEH



A clinical image taken with Philips Vereos PET/CT

Advanced CT imaging proves as accurate as invasive tests to assess heart blockages

An ultrafast, 320-detector computed tomography (CT) scanner that shows both anatomy within coronary arteries and blood flowcan accurately sort out which people need – or don't need – an invasive procedure to identify coronary blockages, according to an international study. The researchers say their findings could potentially save millions of people worldwide from having an unnecessary cardiac catheterization.

The study, known as CORE 320, involved 381 patients at 16 hospitals in eight countries. An article on the results was published online by the European Heart Journal on November 19, 2013.

In the study, participants were evaluated with a 320-detector CT and conventional tests that are widely used today. The researchers say 91% of those in whom the CT scan ruled out blockages would not have required invasive treatment such as stenting or bypass surgery. So those patients, none of whom had a history of coronary artery disease, could have avoided invasive tests because for them the CT scan was just as accurate in determining who would be a good candidate for revascularization as the conventional tests.

"Ours is the first prospective, multicenter study to examine the diagnostic accuracy of CT for assessing blockages in blood vessels and determining which of those blockages may be preventing the heart from getting adequate blood flow," says Joao A. C. Lima, M.D., senior author of the study and a professor of medicine and radiology at the Johns Hopkins University School of Medicine. "We found an excellent correlation in results when we compared the 320-detector CT testing with the traditional means of assessment using a stress test with imaging and cardiac catheterization."

The study findings, says Lima, would apply to people who have chest pain but not a heart attack based on EKG and other evidence. Many people in that situation are sent to a cardiac catheterization laboratory for further evaluation with angiography, an invasive test to look for blockages in the coronary arteries using dye and special X-rays. About 30% of people who have such catheterization are found to have minimal disease or no blockage requiring an intervention to open the vessel with a stent or bypass the vessel through surgery, says Lima.

The 381 patients who completed the study had traditional single-photon emission computed tomography (SPECT) tests and invasive angiography. Lima says SPECT, a stress test with imaging, shows reduced blood flow to the heart without indicating the number or specific location of blockages.

Study participants also had two types of tests with a non-invasive 320-detector CT scanner. In the first CT test, the scanner was used to see the anatomy of vessels to assess whether and where there were blockages. That test is known as CTA, in which the "A" stands for angiography. Then, in a second CT test with the same machine, patients were given a medication that dilates blood vessels and increases blood flow to the heart in ways similar to what happens during a stress test. The second test is called CTP, with the "P" standing for perfusion.

"We found that the 320-detector CT scanner allowed us to see the anatomy of the blockages and determine whether the blockages were causing a lack of perfusion to the heart," says lead author Carlos E. Rochitte, M.D., a cardiologist at the Heart Institute (InCor), University of São Paulo Medical School, in Brazil, "We were therefore able to correctly identify the patients who needed revascularization within 30 days of their evaluation."

"Many patients are sent for an angioplasty when they may not need it. Our ultimate goal is to have more certainty about which patients having chest pain – without evidence of a heart attack – need an invasive procedure to open an arterial blockage," says cardiologist Richard George, M.D., an associate professor of medicine at the Johns Hopkins University School of Medicine and a co-author of the study.

"The CTP test added significant information about the patients' conditions and boosted our ability to identify those whose blockages were severe enough to reduce blood flow to the heart," adds George, who developed the CTP method with Lima.

The 320-detector CT provides a complete picture of the heart by making just one revolution around the body. The researchers say the two tests combined – CTA and CTP – still produce less radiation than a scan with the 64-detector CT scanner in widespread use today.

"In our study, the amount of radiation exposure to patients from the two 320-detector CT tests was half the amount they received as a result of the traditional evaluation methods – the angiogram and nuclear medicine stress test combined," says Lima.

The researchers say they will continue to follow the patients in the study for five years, looking for any heart-related events such as heart attacks, as well as hospital admissions, procedures or operations.

The Johns Hopkins Hospital is among the hospitals in the United States that participated in the CORE 320 study, along with hospitals in Germany, Canada, Brazil, the Netherlands, Denmark, Japan and Singapore. Images obtained during the study were evaluated in core laboratories at Johns Hopkins and at the Brigham and Women's Hospital in Boston.

The study was sponsored by Toshiba Medical Systems Corporation. The company was not involved in the study design, data acquisition, data analysis or manuscript preparation. MEH

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INTERVIEW

Is colon cancer preventable?

Colorectal cancer is the third most common cancer in the world and its prevalence is increasing rapidly in certain regions. *Middle East Health* speaks to Professor Heinz-Josef Lenz, an eminent cancer research specialist based at the University of Southern California Keck School of Medicine, about the disease, its epidemiology, and options for prevention and treatment.

Professor Heinz-Josef Lenz

Middle East Health: What exactly is colorectal cancer? Are there known causes of its development? Can it be inherited? What is the risk of it spreading in the body?

Professor Heinz-Josef Lenz: Colon cancer is one of the most common cancers in the world and one of fasted growing cancers in Asia. Most colon cancers develop from a polyp which is a benign growth of the inner lining of the gut. The most interesting fact of the development of colon cancer is that we can very effectively prevent it since it is present in precancerous form, which we can, in most cases, easily spot as a polyp. Most of the colon cancer develops within 5-10 years, giving us a unique opportunity to prevent this cancer with colonoscopies which can identify the polyp and then it can be easily removed. Since colon cancer usually develops in patients older than 50 years we recommend a baseline colonoscopy at 50 years and then every 5-10 years depending on the findings.

We also know very well the risk factors for colon cancer. The main factors are red meat, alcohol, obesity and many other lifestyle factors. It is also very important to recognize the symptoms of colon cancer. If the cancer is in the left side of the colon the symptoms are usually easy to recognize and include constipation and diarrhoea, blood in the stool, pain with bowel movements and others. However, if the cancer grows on the right side, the symptoms are less characteristic and can be like abdominal discomfort and are often mistreated as stomach upset. Any on-going abdominal discomfort should be evaluated and a colonoscopy considered.

In addition to the lifestyle factors leading to colon cancer, there is also a familial form called Lynch Syndrome. If there is any family history of colon cancer and possible ovarian endometrium or gastric cancer, the person should to be evaluated for a possible genetic predisposition. Patients with a genetic predisposition develop colon cancer much earlier (under age of 50) and often on the right side without developing polyps. These patients need to be seen by a genetic counsellor and undergo specific surveillance. We know from studies, if we identify this genetic predisposition, we can successfully prevent any patient in this family dying from colon cancer while undergoing surveillance.

MEH: What is the epidemiology of colorectal cancer – in the World, the US, Europe, Asia and the Middle East (for comparison)?

HJL: The highest incidence of colon cancer is in the Western world, South America, and now also in Asia following the spread of Western diet in the world. In the US, the incidence has been decreasing mainly due to more screening with colonoscopies. Asia now has a higher incidence than the US – Japan has double the

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incidence of the US – because of the change of lifestyle, increasing consumption of a Western diet and less exercise, increasing obesity and more alcohol.

MEH: Is there a gender bias? If so, why?

HJL: Yes there is a link to gender. We know that premenopausal women have significant decrease in the risk of colon cancer. We also know that women who take hormonal replacement have lower risk of colon cancer. This might be only effective on the right side of the colon. However, postmenopausal women have the same risk or maybe higher risk than men. We know that oestrogen plays a role in the right-sided colon cancer and the premenopausal level of oestrogen can prevent the development of disease.

MEH: What are the mortality figures for colorectal cancer? How does it rank (for mortality) compared to other diseases?

HJL: Overall, colon cancer is the third most common disease and one of the most lethal (2nd) depending what statistics you look at. It is a major health problem around the world.

MEH: What do you recommend doctors tell their patients with regards prevention?

HJL: My recommendation is to avoid red meat, decrease alcohol consumption, have regular exercise and eat the Mediterranean diet. Get colonoscopy at 50 and if there is any family history of the disease you may need to check for the disease earlier. If there are any on-going symptoms in the abdomen, make sure that a colonoscopy is considered.

Colon cancer can be easily prevented with regular exercise 20 minutes twice a week, which reduces the risk of colon cancer by 50%.

MEH: Once diagnosed – how do you classify the different stages of progression / advancement of the cancer?

HJL: Depending on the stage of the colon cancer, we do surgery, chemotherapy and radiation. For colon cancer located in the rectum, we usually – depending on the tumour size – give chemo and radiation prior to the surgery. For most colon cancers we perform surgery, but this depends on the tumour growth in the bowel wall and if the cancer travelled to the lymph nodes or spread to other organs. We stage the cancer as I, 2, 3 or 4. Stage I and II disease usually don't require any further therapy and over 80-90% are cured. For patients with stage III colon cancer, which indicates that cancer cells were found in regional lymph nodes, patients receive six months of che-

Oncology Conference in Abu Dhabi in November last year). Can you tell us about these options?

JHL: The introduction of the novel drug regorafenib is important because it gives the oncologist a new tool in their fight against colon cancer. It is a 'smart drug' targeting a very important genetic alteration in colon cancer enabling the disease to grow and metastasize. This oral medication has shown that it prolongs life in patients who have exhausted the standard therapies. This drug has a very unique mechanism of action which explains its efficacy in patients with colon cancer. It is also easy to give and well tolerated.

MEH: Is colorectal cancer curable?

JHL: Colon cancer is a unique disease. Even when the disease has metastasized to the liver, we still have a chance for cure. This is completely different to other cancers, such as lung or breast cancer. It has to do with the special metastatic pattern of the disease and the ability to remove successful liver metastases, since liver is the only organ which can rejuvenate. With increasing efficacy of our therapies we will cure more and more patients. The challenge in the future will be using molecular testing to identify patients who benefit the most from our therapies and the increased understanding of the molecular make up of colon cancer will not only help to select patients, but identify new treatment options. We are in the middle of a molecular revolution and I have no doubt that we will find better therapies using our increasing knowledge of the molecular pathways in this disease.

HJL: MEH: Do you have any specific recommendations for doctors and / or health authorities in the Middle East?

JHL: I have always been impressed by the knowledge and training of oncologists in the Middle East. I have no doubt that the new treatments and the new molecular testing will be quickly integrated in the treatment of patients with colon cancer in the Middle East. We can only understand this disease with global collaborations. We unfortunately know very little about colon cancer in the Middle East since aetiology and different ethnic backgrounds may play a role in the development, progression and outcome of patients with colon cancer. It would be incredibly exciting to better understand the genetic background and molecular make up of colon cancer in this region.

on the WEB OncLive - Colorectal cancer
http://tinyurl.com/oe9co9o

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Heinz-Josef Lenz is Professor of Medicine and Professor of Preventive Medicine, University of Southern California Keck School of Medicine.

Professor Lenz holds the Kathryn Balakrishnan Chair for Cancer Research, and is Associate Director, Clinical Research, Co-Chair of GI Oncology, Co-Director USC Center for Molecular Pathways and Drug Discover at the University of Southern California Keck School of Medicine and USC/Norris Comprehensive Cancer Center in Los Angeles, California.

Global cancer burden rises to 14.1 million new cases in 2012

Data shows significant increase in breast cancers

The International Agency for Research on Cancer (IARC), the specialized cancer agency of the World Health Organization, released in December the latest data on cancer incidence, mortality, and prevalence worldwide. The new version of IARC's online database, GLOBOCAN 2012, provides the most recent estimates for 28 types of cancer in 184 countries worldwide and offers a comprehensive overview of the global cancer burden.

GLOBOCAN 2012 reveals striking patterns of cancer in women and emphasises that priority should be given to cancer prevention and control measures for breast and cervical cancers globally.

Global burden

According to GLOBOCAN 2012, an estimated 14.1 million new cancer cases and 8.2 million cancer-related deaths occurred in 2012, compared with 12.7 million and 7.6 million, respectively, in 2008. Prevalence estimates for 2012 show that there were 32.6 million people (over the age of 15 years) alive who had had a cancer diagnosed in the previous five years.

The most commonly diagnosed cancers worldwide were those of the lung (1.8 million, 13.0% of the total), breast (1.7 million, 11.9%), and colorectum (1.4 million, 9.7%). The most common causes of cancer death were cancers of the lung (1.6 million, 19.4% of the total), liver (0.8 million, 9.1%), and stomach (0.7 million, 8.8%).

Projections based on the GLOBOCAN 2012 estimates predict a substantive increase to 19.3 million new cancer cases per year by 2025, due to growth and ageing of the global population. More than half of all cancers (56.8%) and cancer deaths (64.9%) in 2012 occurred in less developed regions of the world, and these proportions will increase further by 2025.

Sharp rise in breast cancer worldwide

In 2012, 1.7 million women were diagnosed with breast cancer and there were 6.3 million women alive who had been diagnosed with breast cancer in the previous five years. Since the 2008 estimates, breast cancer incidence has increased by more than 20%, while mortality has increased by 14%. Breast cancer is also the most common cause of cancer death among women (522,000 deaths in 2012) and the most frequently diagnosed cancer among women in 140 of 184 countries worldwide. It now represents one in four of all cancers in women.

"Breast cancer is also a leading cause of cancer death in the less developed countries of the world. This is partly because a shift in lifestyles is causing an increase in incidence, and partly because clinical advances to combat the disease are not reaching women living in these regions," says Dr David Forman, Head of the IARC Section of Cancer Information, the group that compiles the global cancer data.

Generally, worldwide trends show that in developing countries going through rapid societal and economic changes, the shift towards lifestyles typical of industrialized countries leads to a rising burden of cancers associated with reproductive, dietary, and hormonal risk factors.

Incidence has been increasing in most regions of the world, but there are huge inequalities between rich and poor countries. Incidence rates remain highest in more developed regions, but mortality is relatively much higher in less developed countries due to a lack of early detection and access to treatment facilities. For example, in Western Europe, breast cancer incidence has reached more than 90 new cases per 100,000 women annually, compared with 30 per 100,000 in eastern Africa. In contrast, breast cancer mortality rates in these two regions are

Breast cancer is also the most common cause of cancer death among women and the most frequently diagnosed cancer among women in 140 of 184 countries worldwide.

almost identical, at about 15 per 100,000, which clearly points to a later diagnosis and much poorer survival in eastern Africa.

"An urgent need in cancer control today is to develop effective and affordable approaches to the early detection, diagnosis, and treatment of breast cancer among women living in less developed countries," explains Dr Christopher Wild, Director of IARC. "It is critical to bring morbidity and mortality in line with progress made in recent years in more developed parts of the world."

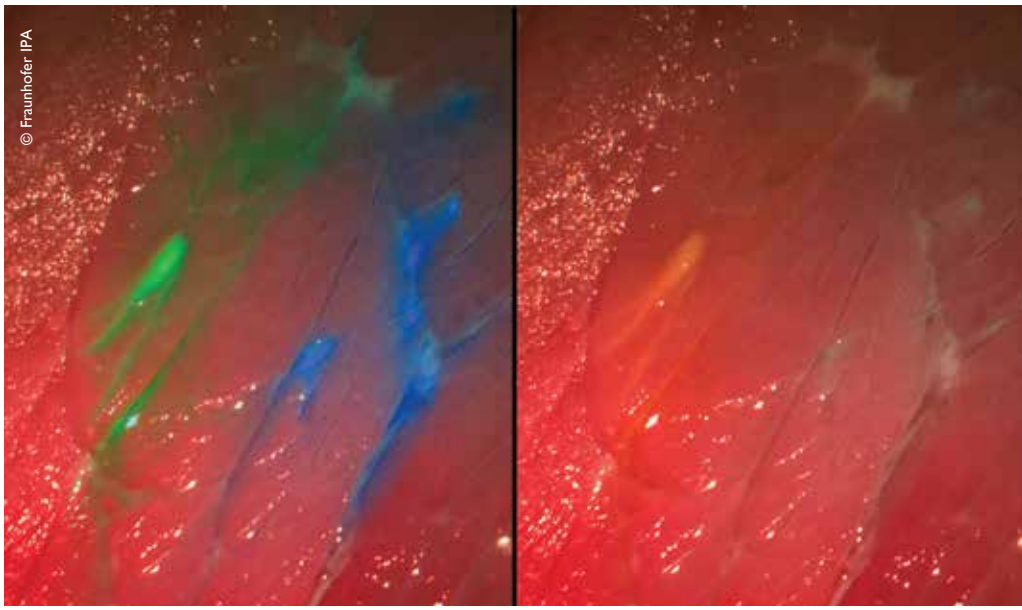
Cervical cancer, an avoidable cause of death among women

With 528,000 new cases every year, cervical cancer is the fourth most common cancer affecting women worldwide, after breast, colorectal, and lung cancers; it is most notable in the lower-resource countries of sub-Saharan Africa. It is also the fourth most common cause of cancer death (266,000 deaths in 2012) in women worldwide. Almost 70% of the global burden falls in areas with lower levels of development, and more than one fifth of all new cases are diagnosed in India.

"Cervical cancer can have devastating effects with a very high human, social, and economic cost, affecting women in their prime. But this disease should not be a death sentence, even in poor countries," says Dr Rengaswamy Sankaranarayanan, a lead investigator for an IARC research project with a focus on cervical cancer screening in rural India. "Low-tech and inexpensive screening tools exist and could significantly reduce the burden of cervical cancer deaths right now in less developed countries."

In sub-Saharan Africa, 34.8 new cases of cervical cancer are diagnosed per 100,000 women annually, and 22.5 per 100,000 women die from the disease. These figures compare with 6.6 and 2.5 per 100,000 women, respectively, in North America. The drastic differences can be explained by lack of access to effective screening and to services that facilitate early detection and treatment.

"These findings bring into sharp focus the need to implement the tools already available for cervical cancer, notably HPV vaccination combined with well-organized national programmes for screening and treatment," stresses Dr Wild. MEH



Left: the new camera displays colored structures by means of fluorescent dyes (blue and green areas shown here).

New fluorescent camera 'paints' tumours to enable more accurate surgical excision

Cancer patients have the highest probability of recovering if tumours are completely removed. However, tiny clusters of cancer cells are often difficult for surgeons to recognize and remove. A new camera may ease this by making hidden cancer tissue visible during an operation. *Middle East Health* reports

Tumour removal surgeries pose a great challenge even to skilful and experienced surgeons. For one thing, tumour margins blend into healthy tissue and are difficult to differentiate. For another, distributed domains of cancer and pre-malignancies are difficult to recognize. Up to now, doctors have depended exclusively upon their trained eyes when excising pieces of tumours. But this is set to change with the development of a new, special camera system that can 'paint' the tumour and help visualize it during surgery, thereby supporting the surgeons during complicated interventions even for the smallest, easy-to-overlook malignant pieces of tumour.

So what's unique about this camera? The camera can display fluorescent molecules that "paint" the cancer tissue. These are injected into the patient's blood circulation prior to the operation and selectively attach onto the tumour during their trip through the body. If the corresponding area is then illuminated with a specific wavelength, fluorescence is emitted and the malignant tissue glows green, blue, red, or any other colour, depending on the injected dye, while the healthy tissue appears the same. In this way, the surgeon can see clusters of tumours cells that cannot be recognized by the naked eye.

The multispectral fluorescence camera

system has been developed by researchers at the Fraunhofer Project Group for Automation in Medicine and Biotechnology (PAMB), which belongs to the Fraunhofer Institute for Manufacturing Engineering and Automation (IPA). In the future, this special camera will integrate into various medical imaging systems such as, surgical microscopes and endoscopes, etc.

Scientists from Mannheim, Germany, exhibited a prototype of the camera at the Medica trade fair in Düsseldorf in November last year. A novel aspect of this camera is that it can display several fluorescent dyes and the reflectance image simultaneously in real time. Systems available until now have not been able to achieve this. The advantage of this is that arteries and delicate nerves that must not be injured during an intervention can likewise be coloured with dye. They too can then be detected with the new camera, since they are set apart from their surroundings.

"The visibility of the dye to the camera depends in large part on the selection of the correct set of fluorescence filters. The filter separates the incident excitation wavelengths from the fluorescing wavelengths so that the diseased tissue is also set apart from its surroundings, even at very low light intensities," explained Dr Nikolas Dimitriadis, head of the Biomedical Optics Group at PAMB.

The researchers require only one camera and one set of filters for their photographs, which can highlight up to four dyes simultaneously. Software developed in-house analyses and processes the images in seconds and presents it continuously on a monitor during surgery. The information from the fluorescent image is superposed on the normal colour image.

"The operator receives significantly more accurate information. Millimetre-sized tumour remnants or metastases that a surgeon would otherwise possibly overlook are recognizable in detail on the monitor. Patients operated under fluorescent light have improved chances of survival," says Dr Dimitriadis.

In order to be able to employ the multispectral fluorescence camera system as adaptably as possible, it can be converted to 'see' other combinations of dyes.

"One preparation that is already available to make tumours visible is 5-amino levulinic acid (5-ALA). Physicians employ this especially for glioblastomas – one of the most frequent malignant brain tumours in adults," explains Dr Dimitriadis.

5-ALA leads to an accumulation of a red dye in the tumour and can likewise be detected with the camera. The multispectral fluorescence imaging system should passed testing for use with humans this year. The first clinical tests with patients suffering from glioblastomas are also planned for this year. MEH

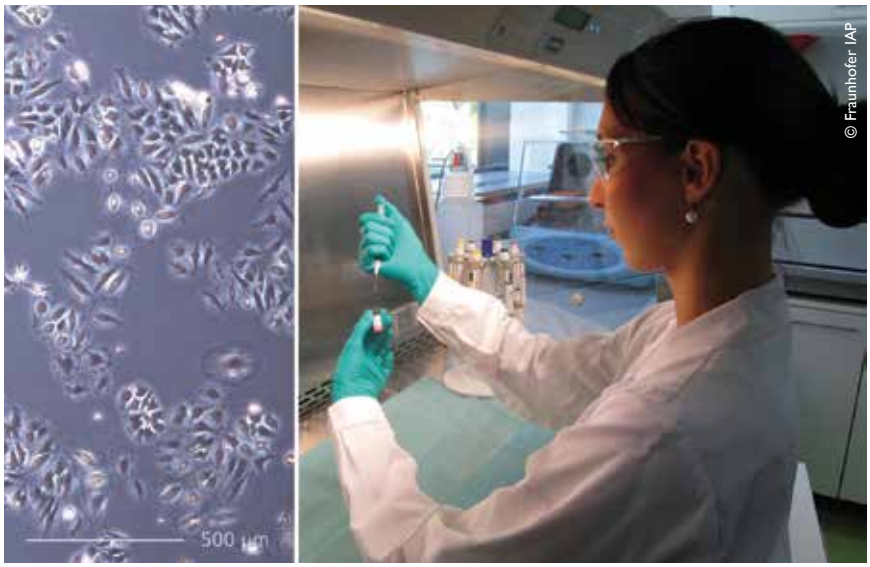
Researchers use nanoparticles to selectively kill tumour cells and spare healthy tissue

Hair loss, nausea, vomiting, fatigue, loss of appetite, loss of eye lashes and eye brows, susceptibility to infection – the list of possible side effects from chemotherapy is lengthy. Many cancer patients suffer from the intense effects that accompany the treatment. High dosages of cytostatic agents are injected subcutaneously or administered intravenously to halt the growth of tumours and also to destroy resistant cells. The more frequently that cells divide, the more effective the active agent is. This applies especially to malignant tumours. However, healthy mucosal tissue and hair cells divide very rapidly as well. They are therefore attacked as well. Scientists have searched long and hard for a therapy that selectively kills off the tumour cells without damaging healthy tissue. Using a new methodology, researchers from the Fraunhofer Institute for Applied Polymer Research (IAP) in Potsdam, Germany, hope to break the vicious circle by utilizing nanoparticles as vehicles for the anti-cancer agents. Since the particles resemble cells on account of their structure, they are suited to steering pharmaceutical substances to the tumour selectively, docking there, and efficiently eliminating the malignant cells.

The researchers used hydrophobic, water-insoluble lipid vesicles as the tiny, 200-250 nanometer pharmaceutical carriers. They are biologically degradable and disintegrate in the body after deployment. Polymers are used to stabilize the nano-envelope, which is furnished with molecules highly specific to and recognized by tumour cells. The envelope of the nanoparticle – experts call it the vesicles – is constructed similarly that of a cell. The scientists load these carriers with doxorubicin, one of the anti-cancer agents frequently used in chemotherapy. Sodium tetradecyl sulfate (STS), a surfactant, helps the active agent to be absorbed better.

The researchers have already been able to prove the efficacy of their approach in laboratory tests.

"We utilized both a cervical cancer strain (HeLa) and cancer of the large intestine (HCT116) for our in-vitro tests. They each react very differently to doxorubicin. HCT116 cells are sensitive to the substance, in contrast to HeLa cells. We ran the experiments with pharmacologically relevant dosages, used by clinicians. The doxorubicin was added to the cell cultures both directly and encapsulated in the nano-carriers," explained Dr Joachim Storsberg. He developed the new therapy jointly with Dr Christian Schmidt and Nurdan Dogangüzel from IAP in close collaboration with colleagues from the pharmaceutical sciences, Professor Mont Kumpugdee-Vollrath and Dr J. P. Krause from Beuth University of Applied Sciences in Berlin.



Cervical carcinoma cells can be selectively and effectively killed off with encapsulated anti-cancer agents (left). Doxorubicin being prepared – one of the agents frequently utilized in chemotherapy (right).

Making chemotherapy more tolerable

The results from the laboratory tests: after three days, 43.3% of the HeLa cells survived a dose of unencapsulated, 1 micromolar (µM) doxorubicin. When the active agent was introduced via encapsulated vesicles, only 8.3% of the malignant HeLa cells survived.

"The pharmaceutical substance in the nano-envelopes was fives times more effective," said Storsberg.

This could also be observed in the tests with the intestinal cancer cells: in this experiment, 46.5% of the HCT116 cells survived a dose of 0.1 µM doxorubicin after two days, while only 13.3% of the malignant tumour cells failed to be eliminated by administering the active agent in encapsulated form.

"With nanoparticles as carriers, a more effective and simultaneously lower dosage is possible. This way, and with a targeted delivery of the active agent, the healthy cells are likely to be spared and the side effects will be minimized," said Storsberg.

An additional test result: the encapsulation material is only effective when combined with the active agent. The unloaded nano-carrier does not attack the sensitive HCT116 cells. Using their methodology, Storsberg and his team can investigate how effectively an encapsulated pharmaceutical substance acts, as well as how 'toxic' the actual nanomaterial is.

"That has not been feasible to date," emphasized the chemist.

The researchers presented their findings at Nanotech Dubai, in October, last year. However, a series of clinical tests with cancer patients will only be set up if these observations are confirmed in in-vivo experiments. MEH

Health Authority-Abu Dhabi addresses lung cancer

Lung cancer has emerged as the most deadly form of cancer for males in Abu Dhabi and second for both sexes. In 2012, the condition claimed the lives of 48 people. Lung cancer has a high mortality, with most cases diagnosed at the very late stages – typically at stage 4. By this time, the condition has already spread to other parts of the body. In 2012, 53 cases of lung cancer were reported, 81% of whom were male with 74% being expatriates.

Smoking is the leading cause of lung cancer and is responsible for almost 9 out of 10 cases. Even passive smoking increases the risk of lung cancer by between 20 and 30% due to the carcinogenic content of the over 4,000 chemical compounds released with tobacco smoke. Smoking causes 71% of global lung cancer deaths and 22% of global cancer deaths in general.

Health Authority – Abu Dhabi (HAAD), the regulating body of the healthcare sector of the Emirate of Abu Dhabi, discussed risk factors, preventive measures, and general information related to lung cancer at its Lung Cancer Awareness Roundtable held in November last year at the HAAD headquarters. With the them 'Breathe Life,' the forum marked the second Wave of HAAD's six-month 'Live Healthy and Simply Check' cancer awareness campaign which aims to increase knowledge and encourage behaviour that reduces the risk of developing cancer and emphasizes the importance of regular screenings to decrease the risk of cancer-related deaths. Smokers can reduce their risk of lung cancer by as much as 30% to 50% per cent, 10 years after they quit the habit.

The Authority also discussed other contributing factors such as workplace exposure to cancer-causing substances including asbestos, silica and diesel vapors; air pollution; family and medical histories; and suppressed immunity, among others.

"It is very unfortunate that many people continue to die of lung cancer on a yearly basis despite the fact that the main cause is known. Our ongoing cancer awareness campaign provides an effective platform for informing the public about the dangers of smoking. This is coupled with the national efforts and laws to control tobacco use in the UAE. Signs and symptoms can take years to develop, and late diagnosis is associated with high mortality. It is thus critical to take the necessary precautions and measures at the early stages to detect or prevent lung cancer," said Dr. Omniyat Al Hajeri, Director of Public Health and Research at HAAD. MEH

Under diagnosed, under treated, under estimated

The campaign to raise awareness of non-transfusion-dependent thalassaemia

The Iron Health Alliance, sponsored by Novartis Oncology, is running a photo documentary campaign to put a human face on the little known condition of non-transfusion-dependent thalassaemia (NTDT). The campaign portrays the inspirational stories of four NTDT patients from India, Italy, Lebanon and Thailand and their life journeys with a chronic disease.

Middle East Health shares some of the photos from the campaign and speaks to two specialists in the field: Dr. Androulla Eleftheriou, the Executive Director of the Thalassaemia International Federation; and Professor Ali Taher, Professor of Medicine, Hematology & Oncology at the American University of Beirut.

The Iron Health Alliance is a global initiative dedicated to sharing the latest iron-toxicity knowledge with communities worldwide. The mission of the alliance is to increase awareness, provide support, and educate physicians and patients about iron toxicity.

on the WEB The NTDT Voices campaign
www.NTDTVoices.com


Dr. Androulla Eleftheriou

The Interviews

■ ***Middle East Health*: What is thalassaemia and how wide-spread is it?**

Dr. Androulla Eleftheriou: Thalassaemia is a group of hereditary blood disorders in which a genetic defect does not allow the adequate production of proteins (globins) which make up the haemoglobin molecule. These globins are four, but the major conditions arise by non-production or underproduction of two of them, the alpha globin chain and the beta globin chain (usually denoted by the Greek letters α or β). Non-production of a major component of the molecule results in a non-functional molecule, hence a severe anaemia. These genetic conditions are the commonest of the serious hereditary conditions of the human population. It is estimated that 5-7% of the global population are healthy carriers of the condition and since transmission is according to recessive Mendelian inheritance, it requires that both parents should be carriers for an affected child to be born.

The exact carrier rate is not known for all population groups, but from estimates it is expected that around 60,000 new affected cases are born each year (N.B. there are other inherited abnormalities which affect the haemoglobin molecule which affect the

Above: Michele, 38 years old, Italy, Shop assistant, Beta Thalassemia Intermedia
Below: Youssef, 35 years old, Lebanon, Department Head in Retail, Beta Thalassemia Intermedia

structure rather than the quantity of proteins, known as variants. These also cause anaemia, but have other consequences as well. These are even more common than the thalassaemias). The exact number of patients is also unknown since the conditions are lethal and untreated patients die in childhood and without a diagnosis. Even where they are treated, patient registers are not always kept. There will have been several million patients around the globe, had treatment been made available.

The geographical distribution includes the Mediterranean basin, the Middle East, the Indian subcontinent, South East Asia and Southern China. However, population migration has now made these conditions a global concern.

Each of these conditions, α or β thalassaemia, has a spectrum of severity. The more severe forms require regular blood transfusions for survival. These transfusion-dependent forms have other consequences, such as iron overload due to the multiple transfusions, which result in vital organ damage and which needs specialized management to allow for survival and quality of life. Such treatment is available in some countries and has resulted in a near normal existence with many patients entering the professions and having families of their own. The majority, however, do not have access to such care and the reason for TIF's (Thalassaemia International Federation) existence is to promote such services.

MEH: What is non-transfusion dependent thalassemia? How is it different for transfusion dependent thalassaemia and can the disease progress from one form to the next?

AE: Some patients can survive initially without regular transfusions, because of genetic factors. The genetic defects that cause thalassaemia are various and can have other genetic factors interacting. In this milder part of the clinical severity spectrum, the initial 'good' path of the patient, we speak of non-transfusion dependent thalassaemia (NTDT), which may be α or β.

Over time NTDT patients will develop complications, usually in early adult life, which will necessitate recourse to transfusions and other interventions. Close monitoring of this group of patients is necessary from early childhood to recognize complications early.

Both α or β thalassaemia include a wide range of syndromes and some of them are of major clinical significance and, in the absence of treatment, result in the early death and high a rate of morbidity in patients. However, a range of thalassaemia α or β syndromes were, for many decades, considered as clinically of lesser significance and they were marginalised for decades in terms of early diagnosis, effective monitoring and appropriate treatment. Today this is what we refer to as the non-transfusion-dependent thalassaemias. These, are those thalassaemia syndromes that were not of major clinical significance, they did not required life-long transfusion therapy for the survival of patients, which nevertheless ended up with high rates of morbidity and poor quality of life at a later point – during adolescence and adulthood.

NTDTs are different from the clinically major syndromes, because these required transfusions only on occasions under special clinical conditions and not as a life-long therapy. As such, there were no specific guidelines and specific criteria on when and how to monitor and treat these patients. On some occasions, under certain conditions, the thalassaemia syndromes referred to as non-transfusion dependent thalassaemias may progress to transfusion-dependent syndromes – that is syndromes that require transfusion on a life-long basis. The conditions are very well described with all the most recent advances in a text book published in 2012 by TIF under the title "Guidelines for the management of Non Transfusion Dependent Thalassaemia (NTDT)". It highlights the criteria for changing from a non-transfusion to a transfusion-dependent thalassaemia syndrome.

MEH: As the Executive Director of the Thalassaemia International Federation, what are the key goals you are trying to achieve and what are the key challenges you face?

AE: I have been with the Thalassaemia International Federation (TIF) since the 1993 as a volunteer, following and supporting its work through the years, and then officially as the Executive Director since 2006. I have witnessed the progress made in achieving the vision of this federation which is nothing more than the establishment of the 'right of all patients across the world for equal access to quality health care'. In achieving our vision, our mission is the development and establishment of national control programs or the prevention and quality management of haemoglobin disorders in every country where these disorders occur.

> This is the reason why the Thalassaemia International Federation has undertaken a special campaign to educate and spread awareness not only to patients, parents and health professional communities around the world, but also to policy makers and official health-related organisations. Our aim is to reduce or prevent the suffering and delayed diagnosis of thousands of NTDT patients, who in number may well exceed those with β-thalassaemia major.

Six pillars of activities comprise our work at TIF towards our goals: a) the strengthening of the patients' and parents' voice through the establishment of national patient/parent thalassaemia associations; b) the establishment and continuous upgrading of our educational program; c) building collaborations, partnerships and networks with different, relevant stakeholders; d) participating or coordinating projects; e) contributing to policy development or reforms and; f) establishment of effective communications with all our partners and collaborators.

The key challenges, of course, include: a) the under recognition of the contribution of haemoglobin disorders to the national, regional and international public health and disease burden and; b) the difficulties in including these disorders as a

Above: Yoke, 22 years old, Thailand, University student, Hb H Thalassemia
Below: Uttam, 41 years old, India, Artisan Jeweler, HbE / beta Thalassemia

priority in health agendas, in the context of national control, prevention and management plans as a pre-requisite for the effectiveness and sustainability of these programs.

It is common that in low-resource countries the focus of the national health authorities is on other health priorities and in overcoming great challenges, such as the management of communicable diseases, the emergence of new agents and the re-emergence of already existing communicable diseases and, of course, the promotion of programs on non-communicable diseases in which haemoglobin disorders occupy a poor place. In addition, weak health infrastructures, low educational health literacy and 'out-of-pocket' policies for addressing the cost of treatment for multi-organ diseases, such as thalassaemia and sickle cell disease, indeed constitute important obstacles and challenges in moving forward effectively.

In contrast the challenges in high resource countries are different and these focus on increasing the access of patients to treatment and improving already existing services, to address the needs of these diseases, which are often considered as "immigrant diseases" or diseases that were literally introduced into the indigenous population through the migration of populations across geographical and cultural borders.

MEH: What is the federation doing to overcome these challenges?

AE: The Federation has officially established communications with international bodies such as the World Health Organisation (WHO) with which we have worked in official relations since 1993, but also with other official health bodies and agencies. like the European Medicinal Agency (EMA), the US Food and Drug Administration (FDA), the regional collaborating offices of WHO, ASEAN and the EU.

Furthermore, we have established a wide network of medical and health professionals in more than 60 countries across the world, and created networks of experts of different disciplines at regional and international level. The Federation has established an international advisory panel that supports and develops our educational program for which TIF claims a truly measurable impact on education and awareness globally. This programme is comprised of events and publications translated into a wide range of languages and distributed across 72 countries as a free-of-charge service to the medical/scientific and patient/parent communities.

In addition, we provide a plethora of information through TIF's website which is updated on a regular basis and, of course, through the intervention in consultation processes in the course of development, or amendment, of polices that are specific or relevant to haemoglobin disorders at a national, regional and international level. For example, at a regional level, in Europe specifically, we had an EU policy report on "Haemoglobinopathies on the Move: is Europe ready?" In Southeast Asia, we have introduced haemoglobinopathies into the agenda, for the first time, of the Association of South East Asian Nations (ASE-

AN). At the international level we have contributed to the adoption by WHO of important resolutions in 2006 and we still continue to be officially integrated in the WHO programs on non-communicable diseases, birth defects, blood transfusion programs and mother and child health programs.

Last, but not least, through our networking and partnerships with other than thalassaemia disease organisations we promote common policies for addressing prevention, neonatal screening and management of these disorders in the context of other programs, like the rare disease initiatives (EUROPLANproject.eu) at the European level.

All the aforementioned constitute important pillars of our work in addressing the numerous challenges we have to face on our move forward.

MEH: Why you are running the NTDT Voices campaign? Why are you focussing specifically on non-transfusion dependent thalassaemia?

AE: In the past two decades the focus has been on the major haemoglobinopathies, thalassaemia β homozygous and sickle cell disease. The dramatic medical and scientific advances that have happened in the past three decades have literally converted these fatal childhood diseases into chronic diseases with high expectation rates of survival and quality of life and have reduced morbidity and mortality related to iron load, particularly in those countries where appropriate management and monitoring policies have been adopted and integrated in national guidelines.

Furthermore, this progress has allowed the medical and research community as well as the patient/parent community globally to understand and realise the gaps of treating and monitoring other thalassaemia α or β syndromes that were considered for decades as clinically milder and not requiring attention or regular follow up. The progress achieved in transfusion-dependent thalassaemias has also allowed us to actually concentrate on the gaps in this area and gave us the opportunity to utilise the scientific data and tools that derived from the research and work on transfusion-dependent β-thalassaemia.

So we have indeed arrived well equipped in recent years to actually apply some of the science on NTDTs to elucidate the labyrinth of the unknown around what was for years considered as milder forms on thalassaemia. This is the reason why TIF has undertaken a special and specific campaign to educate and spread awareness to patients and parents and health professional communities around the world, but also to policy makers and official health-related organisations.

MEH: What do you hope to achieve with the NTDT Voices campaign?

AE: Our aim is to reduce or prevent the suffering and delayed diagnosis of thousands of NTDT patients, who in number may well exceed those with β-thalassaemia major. Early diagnosis and adoption of effective and regular monitoring to allow prompt medical intervention, are what we wish to achieve through our project in the years to come. These patients have been in pain and agony, in uncertainty and out of the regular follow-up in reference centres. TIF wishes to see this chain stopped here.

What we hope to achieve with the NTDTs Voices campaign is the spread of awareness, education and the inclusion and integration of the diagnosis, monitoring and treatment of the NTDTs into the protocols of national health authorities in the same way and to the same level as we have done for the transfusion-dependent thalassaemias globally.

Furthermore TIF is making an effort to bring together and connect patients and caregivers with a dynamic, online video sharing platform where patients from all over the world can share their challenges and triumphs in living with thalassaemia. As a result, patients and caregivers may learn tips and best practices from one another, forge bonds where they previously did not exist, and find comfort and confidence in the management of their disease from one another.

MEH: What message would you like to give doctors and health authorities regarding thalassemia?

AE: The message we would like to give to doctors and health authorities is that the Ariadne's thread has now stretched and the patient community has found its way out of the labyrinth of doubt, fear and the unknown, thanks to new scientific and medical developments. We feel now that we are taking the last steps that lead us to the final exit of the labyrinth. We are now safely advocating that we are able to prevent effectively and to treat and monitor appropriately, all the range of thalassaemia syndromes, decreasing morbidity and mortality amongst these patients, providing a better quality of life to our global patient community, integrating them appropriately into society and enabling their dreams to come true.

Dr Ali Taher

Middle East Health: How prevalent is thalassaemia in the Middle East region – TDT and NTDT? Is it increasing or decreasing?

Dr Ali Taher: Annually, it is estimated that more than 40,000 people worldwide are born affected by β-thalassemia, though it has been suggested that this is likely an underestimate. There is a high incidence in the Mediterranean basin and Middle East, we estimate that we have 3-6% carrier rate.

We in the Middle East are proud to be the pioneers in the scientific work done on NTDT in the world. A large bulk of what we know today about the disease emerged from our centres; we are on the cutting edge of progress in all aspects of the disease. From experience, we estimate that one third of thalassaemia cases are NTDT, although accurate incidence

has not yet been established.

The Middle East is a very diverse region; Incidence of thalassaemia is decreasing in areas where solid awareness campaigns exist. However, in areas where there is lack of education to the general population about the disease, the incidence is increasing.

MEH: To what extent does thalassaemia reduce quality of life and life expectancy?

AT: Since thalassaemia turns from an acute, life-threatening disease into a lifelong chronic condition, assessing and maintaining quality of life becomes even more important for patients. A few years ago we realized that there was a lack of insight about the quality of life that thalassaemia patients have; consequently several studies were done in our centre in Lebanon and in the Middle East region to assess "quality of life" in thalassaemia patients. Although different approaches were used they all shared the same end result; thalassaemia patients have lower Health Related Quality of Life (HR-QoL), lower Mental Health Score and lower Physical Health Score, when compared to the normal population. Contrary to previous beliefs, NTDT patients report substantially lower Quality Of Life and mental health problems when compared to TDT patients. With the advent of new treatment strategies and better understanding of the disease thalassaemia patients' life expectancy has increased massively in the past few years. Thalassaemia is now regarded as a chronic disease and patient mortality is largely related to complications, rather than the disease itself.

MEH: As an inherited disease, does the high rate of consanguinity in the Arab world have a role to play in the cause of this disease? What can be done about this?

AT: Since thalassaemia is a genetic disease and is highly prevalent in the Arab world, the high rate of consanguinity is a major cause of development of this disease. Nevertheless the high carrier rate is also major contributor.

In the late 1970s several pilot population programs directed to prevent βthalassaemia major by carrier screening, counselling, and prenatal diagnosis started in several at-risk populations in the Mediterranean region. At present, several countries in our region have set up comprehensive national prevention programs, which include public awareness and education, carrier screening, and counselling, as well as information on prenatal diagnosis and pre-implantation diagnosis. In a number of countries, including Lebanon, Iran, Saudi Arabia, Tunisia, United Arab Emirates, Bahrain, Qatar and Gaza Strip, there is legislation that makes it mandatory to have premarital diagnosis aimed at limiting carrier-carrier marriage. It is also noteworthy to say that collaboration with religious authorities has increased adherence to such premarital programs and is beneficial in the long run.

MEH: As a doctor in the Middle East, what are the main challenges you face with regards to thalassemia? What can / or is being done to resolve these issues?

AT: The Middle East is a vast and extremely diverse region. There is a lot of contrast among countries. Although some countries have excellent awareness and treatment programs, some countries still encounter major problems.

Despite a colossal effort aimed at reducing the incidence of thalassaemia in our region, lack of awareness remains the biggest challenge we face. In order to have a good awareness program, multidisciplinary meetings should be held among physicians, family planning workers, nurses and social workers, to discuss the clinical characteristics, the natural history, the principles of genetic counselling, and the methodologies for preventing the birth of affected children. Population education makes use of mass media, posters, and informational booklets, which are left at various key sites, such as family planning clinics, marriage registries, and counselling rooms.

Another serious problem we face is of lack serious screening programs in some countries in the Middle East. A critical prerequisite for a screening program is the organization of adequate facilities to meet the demand both for screening and prenatal diagnosis.

Despite a colossal effort aimed at reducing the incidence of thalassaemia in our region, lack of awareness remains the biggest challenge we face.

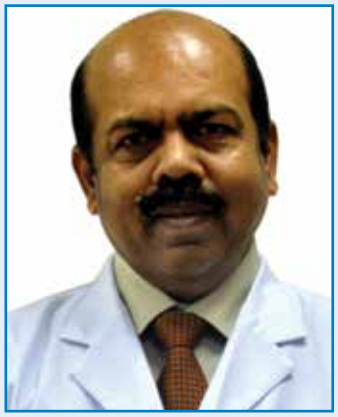
Last, but not least, pharmacotherapy is a cornerstone for better health in thalassaemia patients. Many patients in our region still lack access to adequate treatment. Since many thalassaemia patients come from low socioeconomic status, legislation should be passed in all countries to enable these people to have access to treatment and have their treatment expenses sponsored.

MEH: What message would you like to give doctors and health authorities in the region regarding thalassemia?

AT: The most important message to deliver is awareness about thalassemia. Health authorities and doctors should collaborate to develop a system that aims to prevent new thalassaemia cases. This can be achieved through awareness campaigns targeted at various levels, a judicial system that will to pass strict premarital laws regarding thalassaemia and guidance from local religious figures.

We have come a long way, especially in the past few years in the management of thalassemia. We have had many triumphs in this field that has transformed thalassaemia into a chronic disease. We, in the Middle East should form a collaborative force working towards replicating the successes in terms of prevention in certain countries to the whole region. MEH

How to identify if your headache is dangerous?



By Dr. Prof. Prem Kumar Sinha
Consultant Neurologist, International Modern Hospital, Dubai

Headache is defined as pain in the head that is located above the eyes or the ears, behind the head (occipital), or in the back of the upper neck. Pain arising from sinuses and eyes can also be interpreted as headache – like glaucoma pain arising from eyes, which is an emergency, and acute sinusitis. Headache is the presenting symptom in almost one third of cases reporting to neurologists.

Headache is a symptom, which may be secondary to underlying serious disease (secondary headache) e.g. tumour or may be without any underlying structural serious disease (primary headache), like migraine

The most common cause of primary headache is migraine headaches, or its variants like tension headaches, and cluster headaches, constituting almost 90% of cases. In this condition the brain is structurally normal, and headache is triggered by various environmental factors, like sleep deprivation or fasting, etc. It is also called primary headache. Migraine affects children as well as adults. An estimated 6% of men and up to 18% of women will experience a migraine. In general practice, migraine headaches often go undiagnosed or are misdiagnosed as tension or sinus headaches. As a result, many migraine sufferers do not receive effective treatment. All headache sufferers deserve evaluation by a neurologist.

Only 10% of cases of headache are due to secondary causes, like brain tumour, brain haemorrhage, cerebral venous thrombosis or infections of brain, etc.

But one should not delay or miss the diagnosis of secondary headache because it could be life threatening. Important examples of diseases causing secondary headaches include:

- Tumours in the brain, including tumours that have spread (metastasized) to the brain from another organ such as the lung or breast. This needs urgent care for good outcome.
- Haemorrhage or hematomas, which are collections of blood underneath the dura (the covering of the brain) due to bleeding from ruptured veins. Subdural hematomas typically occur in elderly individuals after a fall or other trauma to the head. Post traumatic bleed with fracture is due to epidural bleed. This needs urgent attention.
- Infections such as meningitis/encephalitis caused by bacteria or viruses or fungus or tuberculosis, presents with headache, vomiting, fever and confused behaviour. It needs urgent appropriate antibiotic treatment – any delay may be life threatening.
- Subarachnoid haemorrhages which are caused by bleeding into the space between the brain and its outer arachnoid lining. The most common source of subarachnoid haemorrhage is an aneurysm, (a ballooning of the weakened wall of an artery inside the head). This is a life threatening emergency. It presents as sudden severe headache and may be associated with vomiting or fainting, it is like bolt from blue, having "never before headache". It needs urgent neurosurgical and neuroradiological care.
- Cerebral venous thrombosis – women on oral contraceptives are prone to thrombosis of blood vessels (venous sinuses) in the brain – causing headache. Some people are prone to blood clotting by birth may have a history of deep vein thrombosis. This condition is may be missed on CT scans. It needs MRI with venogram to pick up the disease. It is treated by blood-thinning drugs, like heparine.
- Temporal arteritis – inflammation of the temporal artery which runs beneath the skin of the temple. It occurs primarily in older people. It presents with headache and tenderness of the temple and may be associated with fatigue and body aches. If prompt treatment with steroids is delayed, it may lead to loss of vision.
- Acute angle Glaucoma with sudden elevation of pressure inside the eyes, presents with painful red eyes. Delay in treatment may cause loss of sight. Infections of the sinuses (Sinusitis), Ear (Otitis), and teeth, if not treated promptly may spread to the brain.

What are the tests for headaches?

The patient history and physical examination provide the best means for determining the cause of secondary headaches. Therefore, it is extremely important that patients with severe headaches undergo examination by a doctor experienced in diagnosing and treating headaches. A few tests may be useful in diagnosing the presence and cause of secondary headaches including blood tests, CT scan and MRI scans of the head

> The patient history and physical examination provide the best means for determining the cause of secondary headaches.

as well as lumbar puncture and electroencephalogram (EEG).

When must you consult a neurologist?

Many people who suffer from mild headaches medicate themselves with over-the-counter analgesics, and they usually do not seek medical care. Nevertheless, the symptoms of primary headaches and secondary headaches can overlap. Furthermore, a person with a long history of migraine or tension headaches can develop a new secondary headache. Therefore, a doctor should be consulted if the headache is:

- Sudden severe headache ("the worst ever")
- Different than the usual headaches
- Starts suddenly during exertion
- Aggravated by exertion, coughing, bending, or sexual activity
- Associated with persistent nausea and vomiting
- Associated with stiff neck, fever, dizziness, blurred vision, slurred speech, unsteady gait, weakness or unusual sensations of the arm or leg, excessive drowsiness or confusion
- Associated with seizures
- Associated with recent head trauma or a fall
- Not responding to treatment and is getting worse
- Disabling, and interfering with work and the quality of life
- Requires more than the recommended dose of over-the-counter analgesics for relief MEH

The role of surgery in diabetes

By **Dr. Girish Kumar Juneja,** MS, Dip MIS (France)
Fellow of ACE Bariatric Center (Emeen, Netherland)
Specialist General / Laparoscopic Surgeon
Head of Bariatric Dept. International Modern Hospital, Dubai.

Dr. Girish Kumar Juneja

Diabetes is epidemic, with more than 170 million people affected worldwide. It is estimated that the number will exceed 366 million by 2030.

In 2000, for the first time in the history of human evolution the number of adults with excess weight surpassed the number of those who were underweight. Excess body weight is now widely recognized as one of leading health threats in most of the countries around the world and considered a major risk factor for diabetes mellitus, cardiovascular disease and hypertension.

Surgery

There are two types of diabetic patients: Diabetics with morbid obesity and diabetics without morbid obesity, but only overweight.

Diabetes with morbid obesity

Recently strong interest has arisen in weight-loss (bariatric) surgery as a treatment for diabetes in obese patients. There is strong evidence that bariatric surgery, beside reducing weight, also causes remission of diabetes and the need for anti-diabetic medication.

With this surgery, remission from diabetes can vary between 60% to 95% depending on type of procedure done.

Procedures which have proven results are:

1. Gastric bypass
2. Gastric sleeve procedure

Both procedures are very effective for diabetes control and remission.

Beside weight-loss and improvement in diabetes status, this surgery helps improve blood pressure. It is known that a 1% reduction in body weight is associated with a reduction of about 1 mm in systolic BP and of about 2mmHg in diastolic BP whereas 10% reduction of weight in overweight patients leads to 20% reduction in the CVD risk.

Diabetes without morbid obesity but only overweight

This category of diabetic patients are not obese, but are overweight (BMI 30 – 35). Several studies have confirmed improvement of diabetes in these individuals, but it still needs more study to confirm that net benefits outweigh harm in this patient population. The good news is that this category of patients can also benefit from newer procedures like:

- Ileal transposition – initial results of this procedure are very encouraging

Patients with diabetes prior to surgery appear to have greater reductions in cardiovascular events than patients without diabetes. Thus, the benefits appear to outweigh any harm, particularly for obese patients with diabetes.

Overall people with shorter duration of diabetes and less severe of type-2 diabetes were linked to higher rates of post surgery remission. These results lead to the conclusion that surgery should be offered earlier rather than later in the course of type-2 type diabetes for those who are eligible.

The new endoscopic endobarrier procedure is showing good results in these diabetic patients.

Conclusion

In conclusion we can say that:

1. Diabetes can be cured or improved by surgery, especially in obese people
2. Surgery should be offered as a solution at an early stage for eligible patients
3. Weight-loss surgery not only reduces weight, but also benefits diabetics and reduces cardiovascular risk in morbidly obese people
4. For non-obese, but overweight people, newer procedures like ileal transposition and endoscopic endobarrier procedures are showing very encouraging results MEH

INTERVIEW

Codonics Safe Labelling System improves patient safety, lowers costs

King Hamad University Hospital (KHUH) in Bahrain has installed the Codonics Safe Labelling System. *Middle East Health* speaks to Lt. Colonel (Dr) Khalid Ahmed Al-Sindi about the system.

MEH: Why did KHUH choose to install the Codonics Safe Labelling System (SLS)?

Lt. Col. Dr. Khalid Al Sindhi: King Hamad University Hospital (KHUH) in Bahrain is committed to delivering outstanding healthcare that meets and exceeds international and national standards. The prestigious, technologically advanced hospital is leading the region with their commitment to implement advanced technologies to ensure patients receive unmatched care.

The operating room (OR) is a hectic environment where immediate decisions must be made, increasing the chance of human error for mistakes such as vial and ampoule swaps, mislabelling medications, and syringe swaps. Recent estimates reveal that drug errors occur in one out of every 140 cases* and many more are likely unreported. In order to ensure medication labelling accuracy and compliance throughout their hospital, KHUH had a vision and turned to Codonics Safe Label System, an FDA-cleared medical device. A first-of-its-kind technology, Safe Label System (SLS) helps to significantly reduce medication labelling errors and healthcare costs through improved patient safety anywhere medications are prepared.

KHUH also purchased and installed Codonics Container Labeling System (CLS) to incorporate compliancy into their pharmacy and throughout the facility. Used in pharmacy, CLS enables barcode unit dose labelling to improve efficiency and increase accuracy. The device creates and prints data matrix labels that feature machine-readable barcodes that can be read by SLS or any other system with a barcode scanner.

KHUH has recognized the need and safety impact of unit dose vial barcoding. They also understood the value of having a "second set of eyes" for clinicians when medications are prepared, as well as the importance of a "triple check" prior to administering the drug to the patient.

The Hospital Commander, Major General (Dr) Salman Bin Ateyatallah Al Khalifa of the King Hamad University Hospital says that not only have Codonics systems driven down our costs, we have seen an improvement in our workflow which has enabled our providers to spend time on their patients. These user-friendly technologies have helped us provide outstanding healthcare and ensure our patients' safety.

MEH: When was it installed? How long did it take to set up? Did it require specific staff training to use the system?

KAL: The Safe Label System and Container Labeling System were installed at the site in December 2012. The systems utilize a formulary which is managed in the pharmacy. This formulary database contains all of the hospital-approved drugs. Codonics worked with KHUH pharmacy staff to ensure the formulary was complete and accurate, and then it was deployed to every SLS via the network. The benefit is like having a pharmacist at every medication preparation location throughout the hospital.

MEH: In which departments / sections of the hospital has it been installed?

KAL: SLS is used in the facility's operating rooms, NICU, PICU, Intermediate Care Unit, ICU, Labor & Delivery, ER, Day care, Radiology and Pharmacy.

Major General Salman Bin Ateyatallah Al Khalifa says the system enables the hospital to quickly, conveniently and accurately label our medications for syringes and IVs anywhere immediately upon preparation using barcode technology.

MEH: How does the SLS work?

KAL: Safe Label System (SLS) greatly reduces injectable medication errors common in the operating room. SLS simplifies and improves the safety and accuracy of syringe labelling, helping to eliminate vial and ampoule swaps, mislabelling, and syringe swaps.

SLS sits on your existing anaesthesia drug cart. When a drug is ready to be prepared, the clinician uses SLS to scan the vial or

container. The drug is instantly verified against the pharmacy's drug database. SLS then speaks and visually displays the drug name and concentration to confirm the selection, acting as a second pair of eyes. A full-colour label is printed on demand and includes the drug name, concentration, preparer's initials, expiration time and a barcode. Once the syringe is prepared and labelled, it can be 'triple-checked'. Using SLS to scan the barcode on the syringe label prior to injection provides the final visual and audible confirmation of the drug name as well as the time remaining until it expires.

Using the SLS touch screen, dilutions can be easily accommodated and include safety guardrails to avoid mistakes. When a drug is diluted, the easy-to-read label is printed showing the new dilution and concentration. From the touch screen, users can also quickly print line and catheter labels for both ends.

Major General Salman Bin Ateyatallah Al Khalifa says the hospital is keenly aware of worldwide medication labelling standards and has chosen to install the system throughout our hospital not only for compliancy, but also for safety.

To support global medication labelling standards, SLS integrates worldwide best practices and international standards, including the Joint Commission International, recommendations of the European Society of Anesthesia (ESA), and ISO standards (a specific colour for each therapeutic class). With SLS, clinicians will never have to handwrite labels and every syringe will be clearly, safely and compliantly labelled.

MEH: Has there been a noticeable improvement in patient safety at KHUH because of this SLS? If so, can you explain how and why it has improved?

KAL: Major General Salman Bin Ateyatallah Al Khalifa, says the Codonics system not only improves our patient safety, but it has lowered our healthcare costs and enabled us to concentrate on what matters most – our patients. We believe in providing our patients with world-class healthcare, and we've made a choice to do that proactively through technologies that help avoid human error in medication preparation and delivery. The system has become an invaluable tool for our clinicians. We believe that the technology should be the standard of care, helping to prevent medication errors anywhere medications are prepared."

* **Source**: "Syringe Swaps" in OR Still Harming Patients; Medication

Mishap Mitigation Drives 2008 APSF Workshop, by John H. Eichhorn, MD

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Chief of Diagnostic Departments & Allied Health Services
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Sanofi celebrates 90 years of insulin production

Sanofi invited *Middle East Health* and journalists from several other publications in the region, Russia, and Africa to visit their insulin production plant in Frankfurt, Germany in November. The trip also included a short stop in Tours, France where, for the first time, they showed journalists around their anti-counterfeit drug lab. **Callan Emery** reports.

Sanofi is a global pharmaceutical company with a key focus on diabetes, vaccines and consumer health. It has a presence in more than 100 countries, 112 industrial sites and more than 20 R&D sites. It recently acquired Genzyme which has helped it expand its footprint in biotechnology and rare diseases.

The press trip coincided with World Diabetes Day on 14 November as the company celebrated 90 years of involvement with insulin production. In 1923 the company's predecessor Fabwerke Hoechst was one of the pioneering companies to first 'provide insulin of constant quality on a large scale'. Today Sanofi manufactures Lantus (insulin glargine) – the leading insulin brand worldwide.

Beyond the commercial aspect of producing insulin and related medical devices, the company focusses on three initiatives: 1. Supporting people with diabetes; 2. Working with ministries of health, and; 3. Educating healthcare professionals.

Although these initiatives are global, they are designed specifically to each region. For example, in the Middle East, the company launched 'My Diabetes Story' to support people with diabetes in the region through online peer-to-peer initiatives. Since 2007 the campaign has received more than 5.1 million views and established an active online community, which has helped many people in the Arab world overcome the taboo about speaking about diabetes.

In Egypt, Sanofi has been working with the Ministry of Health (MoH) to raise awareness through TV, print, radio and online media.

Sanofi has formed similar partnerships with other MoHs to raise awareness, promote screening and combat discrimination.

In Turkey the company partnered with the MoH and Ministry of Education to promote awareness of diabetes in schools. The campaign reached 7.5 million students and more than half a million teachers in the country. The campaign was so successful that the company plans to extend it to other countries.

A brief history of insulin

Insulin is a peptide hormone, produced by beta cells of the pancreas, and is central to regulating carbohydrate and fat metabolism in the body. Insulin causes cells in the liver, skeletal muscles, and fat tissue to absorb glucose from the blood. In the liver and skeletal muscles, glucose is stored as glycogen, and in fat cells it is stored as triglycerides.

Insulin stops the use of fat as an energy source by inhibiting the release of glucagon. With the exception of the metabolic disorder, diabetes mellitus and metabolic syndrome, insulin is provided within the body in a constant proportion to remove excess glucose from the blood, which otherwise would be toxic

How was it discovered and how is it now produced synthetically?

In 1889, the Polish-German physician Oscar Minkowski, in collaboration with Joseph von Mering, removed the pancreas from a healthy dog to test its assumed role in digestion. Several days after the dog's pancreas was removed, Minkowski's animal keeper noticed a swarm of flies feeding on the dog's urine. On testing the urine, they found there was sugar in the dog's urine, establishing for the first time a relationship between the pancreas and diabetes. It took another 30 years of various attempts to isolate the secretions from the islets of Langerhans in the pancreas before Canadian Frederick Banting, in October 1920, concluded that it was the very digestive secretions that Minkowski had originally studied that were breaking down the islet secretions, thereby making it impossible to extract successfully.

The idea was the pancreas's internal secretion, which, it was supposed, regulates sugar in the bloodstream, might hold the key to the treatment

The Sanofi insulin production plant in Frankfurt, Germany

of diabetes. A surgeon by training, Banting knew certain arteries could be tied off that would lead to atrophy of most of the pancreas, while leaving the islets of Langerhans intact. He theorized a relatively pure extract could be made from the islets once most of the rest of the pancreas was gone.

In the spring of 1921, Banting travelled to Toronto to explain his idea to J.J.R. Macleod, who was Professor of Physiology at the University of Toronto, and asked Macleod if he could use his lab space to test the idea. Macleod was initially sceptical, but eventually agreed to let Banting use his lab space while he was on holiday for the summer. He also supplied Banting with 10 dogs on which to experiment, and two medical students, Charles Best and Clark Noble, to use as lab assistants, before leaving for Scotland. Since Banting required only one lab assistant, Best and Noble flipped a coin to see which would assist Banting for the first half of the summer. Best won the coin toss, and took the first shift as Banting's assistant. Loss of the coin toss may have proved unfortunate for Noble, given that Banting decided to keep Best for the entire summer, and eventually shared half his Nobel Prize money and a large part of the credit for the discovery of insulin with the winner of the toss. Banting's method was to tie a ligature around the pancreatic duct; when examined several weeks later, the pancreatic digestive cells had died and been absorbed by the immune system, leaving thousands of islets. They then isolated an extract from these islets, producing what they called "isletin" (what we now know as insulin), and tested this extract on the dogs starting July 27. Banting and Best were then able to keep a pancreatectomized dog named Marjorie alive for the rest of the summer by injecting her with the crude extract they had prepared. Removal of the pancreas in test animals in essence mimics diabetes, leading to elevated blood glucose levels. Marjorie was able to remain alive because the extracts, containing isletin, were able to lower her blood glucose levels.

Banting and Best presented their results to Macleod on his return to Toronto in the fall of 1921, but Macleod pointed out flaws with the experimental design, and suggested the experiments be repeated with more dogs and better equipment. He then supplied Banting and Best with a better laboratory, and began paying Banting a salary from his research grants. Several weeks later, the second round of experiments was also a success; and Macleod helped publish their results privately in Toronto that November. However, they needed six weeks to extract the isletin, which forced considerable delays. Banting suggested they try to use foetal calf pancreas, which had not yet developed digestive glands; he was relieved to find this method worked well. With the supply problem solved, the next major effort was to purify the extract. In December 1921, Macleod invited the biochemist James Collip to help with this task, and, within a month, the team felt ready for a clinical test.

On January 11, 1922, Leonard Thompson, a 14-year-old diabetic who lay dying at the Toronto General Hospital, was given the

first injection of insulin. However, the extract was so impure, Thompson suffered a severe allergic reaction, and further injections were cancelled. Over the next 12 days, Collip worked day and night to improve the ox-pancreas extract, and a second dose was injected on January 23. This was completely successful, not only in having no obvious side-effects but also in completely eliminating the glycosuria sign of diabetes.

Children dying from diabetic ketoacidosis were kept in large wards, often with 50 or more patients in a ward, mostly comatose. Grieving family members were often in attendance, awaiting the inevitable death.

In one of medicine's more dramatic moments, Banting, Best, and Collip went from bed to bed, injecting an entire ward with the new purified extract. Before they had reached the last dying child, the first few were awakening from their coma, to the joyous exclamations of their families.

Over the spring of 1922, Best managed to improve his techniques to the point where large quantities of insulin could be extracted on demand.

Insulin Hoechst

Meanwhile in Europe, Minkowski had founded the German Insulin Committee. The Germany company Hoechst, which had being doing experiments on pancreas extracts to treat diabetes since 1912, had gained a reputation for producing good quality insulin which was noted by the German Insulin Committee. Hoechst launched "Insulin Hoechst" in Europe in October 1923.

Building on the discovery that insulin was much purer and better tolerated when it was crystalized, Hoechst progressed to become in 1936 the first industrial provider to switch its entire production to this new crystalline form and launched a range of new insulin products in the 1930s and 1940s.

In 1976 the company's scientists made another major breakthrough by being the first to successfully produce a semi-synthetic version of human insulin. However, it took a few more years before the company could produce this new insulin on a large scale.

In the 1980s the company developed its own method of creating genetically modified bacteria to produce insulin. However, due to a lack of clarity with genetic engineering legislation in Germany it was not until 1998 that the company managed to get a manufacturing plant – using this new process – operational.

In 1999 the company launched recombinant human insulin 'Insuman', which finally ended the reliance on animal sources for insulin production.

The Sanofi Diabetes production plant we visited is the historic headquarters of Hoechst in Frankfurt.

In 2001 Sanofi launched 'Lantus', a long-acting, 24-hour insulin analog, which set a new standard in insulin therapy. And in 2005 the company launched 'Apidra', a short-acting insulin analog to help patients achieve glycemic control at meal times by enabling them to adjust the dose according to the meal.

Sanofi Diabetes in Frankfurt now brings together Research and Development, industrial production of insulin and the production of medical devices, such as the insulin pens for injection. MEH

Upping the ante in the battle against counterfeit criminals

Counterfeit medication is an issue of increasing concern globally. According to the World Health Organisation (WHO) no country is free of counterfeit medications. Most developed countries with effective regulatory systems and market control (such as USA, EU, Australia, Canada, Japan, New Zealand) currently have a low proportion of counterfeit drugs, less than one percent of market value. However, trends point to a shift and there has been an increase in the prevalence of counterfeit medicines even in developed countries, says the WHO. The problem is further exacerbated by a number of other factors: scarcity and/or erratic supply of basic medicines, uncontrolled distribution chains, large price differentials between genuine and counterfeit medicines, lack of effective intellectual property right protection, lack of regard for quality assurance and corruption in the healthcare system.

Currently the most counterfeit branded pharmaceuticals include innovative treatments for severe diseases (anticancers, heart diseases, anticholesterol and antihypertensive drugs, psychologic disorders and infections) whereas before, counterfeit had more to do with lifestyle drugs such as erectile dysfunction.

Counterfeit medication is defined by the WHO as "one which is deliberately and fraudulently mislabelled with respect to

Fake drugs can kill

- In 1995, 89 people died in Haiti after ingesting cough syrup manufactured with diethylene glycol (a chemical commonly used as anti-freeze). This particular product was made in China and transported through a Dutch company to Germany, before winding up on the Haitian market. Counterfeit drugs are even more detrimental to public health efforts when healthcare resources of the country considered are limited.
- A survey of seven African countries by WHO found that between 20% and 90% of all anti-malarials failed quality testing. These included chloroquine-based syrup and tablets, whose failure rate range from 23% to 38% and sulphadoxine/pyrimethamine tablets, up to 90% of which were found to be below standard.

identity and/or source. Counterfeiting can apply to both branded and generic products and counterfeit products may include products with the correct ingredients or with the wrong ingredients, without active ingredients, with insufficient active ingredients or with fake packaging.

The WHO points out that counterfeiting is an underworld activity – inmany cases run by organised crime syndicates. It is hard to detect and investigate. Moreover, countries and companies that detect the problem do not always report. So, it is hard to know or even estimate the true extent of the problem. What is known is that they occur worldwide and are more prevalent in developing countries.

There is no simple or quick solution or remedy that can be applied to eliminate counterfeit medicines, nor can the problem be solved by any individual company or government.

The problem has reached a global dimension and needs a global approach and collaboration, says the WHO. The different players of the fight against counterfeiting emphasize the need for an international regulatory framework.

A number of organisations have been set up to try and prevent the production and distribution of counterfeit medicines. These include:

- **International Medical Products Anti-Counterfeiting Taskforce (IMPACT)**

The WHO launched IMPACT in 2006, in response to the growing public health crisis of counterfeit drugs. IMPACT is a taskforce of the WHO, exclusively dedicated to drug and medico-surgical material counterfeiting. IMPACT aims to set up guidelines into models to help countries in their fight against drug counterfeiting.

- **PEI (Protect health, Exchange information, Initiate actions in collaboration with the dedicated authorities)**

PEI is a non-profitable professional organization, whose missions consist in fighting against theft, illegal misappropriations and drug counterfeiting. PEI is an organization made up of 27 members, based in Washington DC, assembling pharmaceutical companies.

- **ACTA (Anti counterfeit Trade Agreement)**

In October 2007, the United States, the European Union, Japan, South Korea, Mexico and New Zealand announced a multilateral agreement plan, so as to establish stronger measures and reference standards in order to guarantee the enforcement of protection rules and intellectual property.

Sanofi's Central Anti-Counterfeit Laboratory

In 2007 Sanofi set up a central co-ordinating unit which brings together internal experts involved in counterfeit medicines from various departments within the company. In 2008 Sanofi set up their Central Anti-Counterfeit Laboratory in Tours, France to analyse

Caroline Atlani, the director of Sanofi's Anti-counterfeiting Co-ordination, speaks to journalists about counterfeit drugs and what Sanofi is doing to combat it.

suspect medicines. The laboratory centralizes all Sanofi products requiring verification about their counterfeit status.

The largest proportion of products received at the lab come from Sanofi's own market surveillance operations through test purchases in high-risk countries and tests on sensitive products on the internet and in pharmacies. Other products come from customs, the police, health authorities and health workers.

Speaking to journalists, Caroline Atlani, the director of Sanofi's Anti-counterfeiting Co-ordination, said: "We are seeing a geographical intensification of counterfeiting which is no longer focussed on one or two parts of the world, but is now global, largely because of the internet. And it touches every therapeutic class."

In a worrying revelation, she said it is not clear how vast the counterfeit operations are. "The more we dig, the more we find," she noted.

She said the WHO estimates that around 10% of all medications are fake and that around 50% of medications sold on the internet are fake.

The lab undertakes the following 4-step procedure to detect fake medicine

1. **Traceability** – searching for information in the database to see if the product has been manufactured in a Sanofi site – including checking the batch number, date of manufacture and packaging.

Key actions that countries should take

- Strengthen legislation ensuring that counterfeiting medical products is a crime and that punishment is commensurate to the consequences that it has on personal health and on the credibility of national healthcare delivery systems.
- Strengthen regulatory oversight ensuring that all manufacturers, importers, exporters, distributors and retailers comply with the appropriate requirements that are necessary for a secure distribution chain for all medical products.
- Improve collaboration among governmental entities (such as health, police, customs, local administrative units, judiciary) that need to work together in order to effectively combat counterfeiters.
- Develop a communication strategy to ensure that health professionals, the general public and the media are aware of the dangers associated with counterfeit medicines.

– WHO / IMPACT

2. **Visual check** – a microscopic examination of the packaging.

3. **General chemical analysis** – chemists use spectroscopic techniques to give a first level analysis of the products chemical composition and comparing it to reference products.

4. **Detailed analysis** – if it is clear that it is a counterfeit product a detailed chemical analysis is carried out to determine whether the product contains any active ingredient or possibly toxic ingredient.

Atlani pointed out that the real impact of fake drugs is on public health. "There is a lack of real treatment. In some cases the drugs may be toxic resulting in death. And fake drugs can also lead to drug resistance because of insufficient active ingredient."

Sanofi has been active for many years in anti-counterfeiting efforts. The group, through its global coordination network, works with local and international public authorities and other stakeholders to protect patients from this threat.

Atlani said the results of their lab analysis are made available to health, police, customs and judicial authorities in France and other countries, which provides a foundation for mobilizing local authorities and launching legal action against organised crime networks that manufacture and distribute fake drugs.

on the WEB IMPACT
www.who.int/impact

The controversy over 'counterfeit' drugs

IRIN reports on one of the biggest hurdles to stemming the global tide of counterfeit medicines – the disagreement over the term itself, which drug companies are accused of hijacking for commercial rather than public health reasons.

There is no dispute over the dangers that fake medicines pose. Often containing few or no active ingredients, they are typically ineffective - and are sometimes actively harmful. Some contain enough of an active ingredient to affect a disease but not enough to eliminate it, contributing to the growth of drug-resistance. And they cost almost nothing to manufacture but bring huge profits to their makers and distributors.

The problem is thought to be widespread in countries with weak regulatory oversight; in 2003, Nigerian health officials estimate that 70% of drugs in circulation in the country were either counterfeit or adulterated.

But international agreement over how to deal with fake medicines has been elusive, with discussions getting bogged down over exactly what kinds of drugs should be targeted. The problem is that the phrase normally used in the debate – "counterfeit medicines" – can refer to far more than chalk pills with forged labels.

The World Health Organization (WHO) defines a counterfeit drug as "a medicine, which is deliberately and fraudulently mislabelled with respect to identity and/or source.

"Counterfeiting can apply to both branded and generic products, and counterfeit products may include products with the correct ingredients or with the wrong ingredients, without active ingredients, with insufficient active ingredients or with fake packaging."

Yet pharmaceutical companies consider even safe, efficacious drugs "counterfeit" when their expensively developed and patented formulas are copied without their permission, or even when their own drugs, licensed and packaged for sale in one country, are diverted, repackaged and sold elsewhere at a higher price.

A meeting at WHO in Geneva in November was due to try to nail down more firmly what international control measures should cover and, just as importantly, what they should not.

The Meeting of the Member State Mechanism on Substandard/spurious/falsified/falsely labelled/counterfeit (SFFC) medical products will focus not on drafting a treaty - such an ambition has been abandoned for the time being - but rather on developing a "programme of work" to curb the sale of such products. This will look at best existing practices and can be tailored to the situations in different regions.

Michael Deats, WHO's project manager for quality assurance and safety of medicines, is cautiously optimistic. "This topic is mired in controversy," he said, "because of the conflict between protection of public health and protection of intellectual property. But we are now getting to the stage where negotiations are starting to settle down, and we have got a better chance of moving forward."

A focus on trade or health?

For Oxfam's senior medical policy adviser, Mogha Kamal-Yanni, the concerns of drug companies are purely a trade issue, with no relevance to public health initiatives.

By conflating the two, "you are transferring the duty of checking and enforcing intellectual property rights from the private owner of those rights to governments, which have very limited resources, and you're not sorting out the problem; the real problem is about bad-quality medicines," Kamel-Yanni told a meeting at London's Chatham House.

Despite efforts to harmonize copyright and intellectual property laws by countries like the US and Japan, which are home to many pharmaceutical companies, these laws vary greatly around the world.

There have been a number of cases in which generic drugs manufactured legally in countries like India, on their way to other countries where those drugs would also be regarded as legal, such as Nigeria or Brazil, have been seized in transit through Europe on the grounds that they violate patents recognized under European legislation.

The result has been bitter opposition to attempts to reach an international agreement on combating counterfeit medicines. Countries like India, China and Brazil allege that big drug companies are trying to use WHO to suppress competition from more affordable generics.

Anna George, of Chatham House's Centre for Global Health Security, says the pharmaceutical industry needs to stop insisting on the catch-all term "counterfeit".

"The industry needs to move away," she told IRIN. "They need to drop that word that causes so many problems, say that their own intellectual property rights will be pursued elsewhere, and allow the debate to focus on health issues."

Shoring up supply chain

Kamal-Yanni says more lasting solutions can be found by investing in supply chains in the developing countries worst affected by the problem.

"As a patient," she said, "if I have access to a trained pharmacist and a good supply chain system, the counterfeiters and the people supplying bad-quality drugs will have limited access to the market. So investing in the supply chain - and in stopping drug shortages in the public sector, which force people to go to private markets with zero regulation - this is the kind of investment that we need before we go for an international treaty."

At the moment, the issue of a treaty is on hold, says WHO's Deats. He told IRIN, "WHO now has a solid platform and an agreed mandate, clearly focusing on public health. We are still at the talking stage rather than the doing stage, but there is now a spirit of cooperation rather than the hostility which existed a few years back.

"The pharmaceutical companies are major stakeholders in the field, so I don't think you can exclude them, but the amount of influence they have mustn't be disproportionate. The low-income countries, which are really suffering badly, would do better to invest in their supply chain and systems of oversight, but there's no 'one size fits all' solution. Our task now is to identify priorities and then get to work with a view to minimizing harm to patients in our member states." MEH

Reducing adverse events in hospitals

Effective Interventions

By **Arby Khan**
MD, FACS, MBA

Introduction

Adverse events, or medical errors, are a significant problem worldwide[1-3]. As health systems develop and evolve in the Middle East and in other developing nations, it would be prudent to build into these systems, early on, ways of tracking and addressing such errors[1, 3]. As many countries in the Middle East are currently preoccupied with developing the basic foundations of their healthcare infrastructures, it is understandable that enough attention might not be devoted to adverse events. However, creating processes to identify and reduce adverse events is best done during the early development of healthcare infrastructure. The cost of not doing so is tremendous, as discussed below, and analyzing adverse events in the United States (US) can provide useful lessons. Currently, the US is in the midst of modifying its reimbursement system to incentivize providers to prevent adverse events – e.g. the recent Affordable Care Act and other rules developed by Centers for Medicare and Medicaid Services (CMS) (see discussion below for details).

This article discusses adverse events in the US and how structuring the reimbursement system, within the framework of economic theory, can decrease adverse events, increase quality of patient care, and decrease costs at the same time. As appropriate to each country in the Middle East, all or some of the lessons learnt could be applicable.

Problem and Magnitude

Medical errors, also known as adverse events (AEs), are a substantial problem in hospitals – they cost approximately $22 billion and cause 98,000 deaths annually in the United States[4, 5]. Adverse events associated with surgical procedures and medication administration account for the majority of errors[4, 6].

Extensive literature – including the 1999 Institute of Medicine (IOM) report titled "To Err is Human" from the prestigious National Academy of Sciences – documents the serious consequences of AEs[2, 4, 5, 7, 8]. These AEs cause not only substantial financial loss (approximately $ 22 billion annually) but also temporary disability, permanent disability, and death[2, 4-6]. For example, medical errors kill approximately 98,000 people in the US every year[2, 4]. If any individual, regardless of socioeconomic or health insurance status, goes to a hospital today, either for admission or for a day-procedure, there is a greater than 9% chance that he/she will be the victim of a medical error[4]. These AEs can happen to anyone – and they do.

In addition to causing loss of money, limb, and life, AEs create profound emotional consequences. Taking your child, father, or spouse to the hospital for a simple, routine operation and coming back

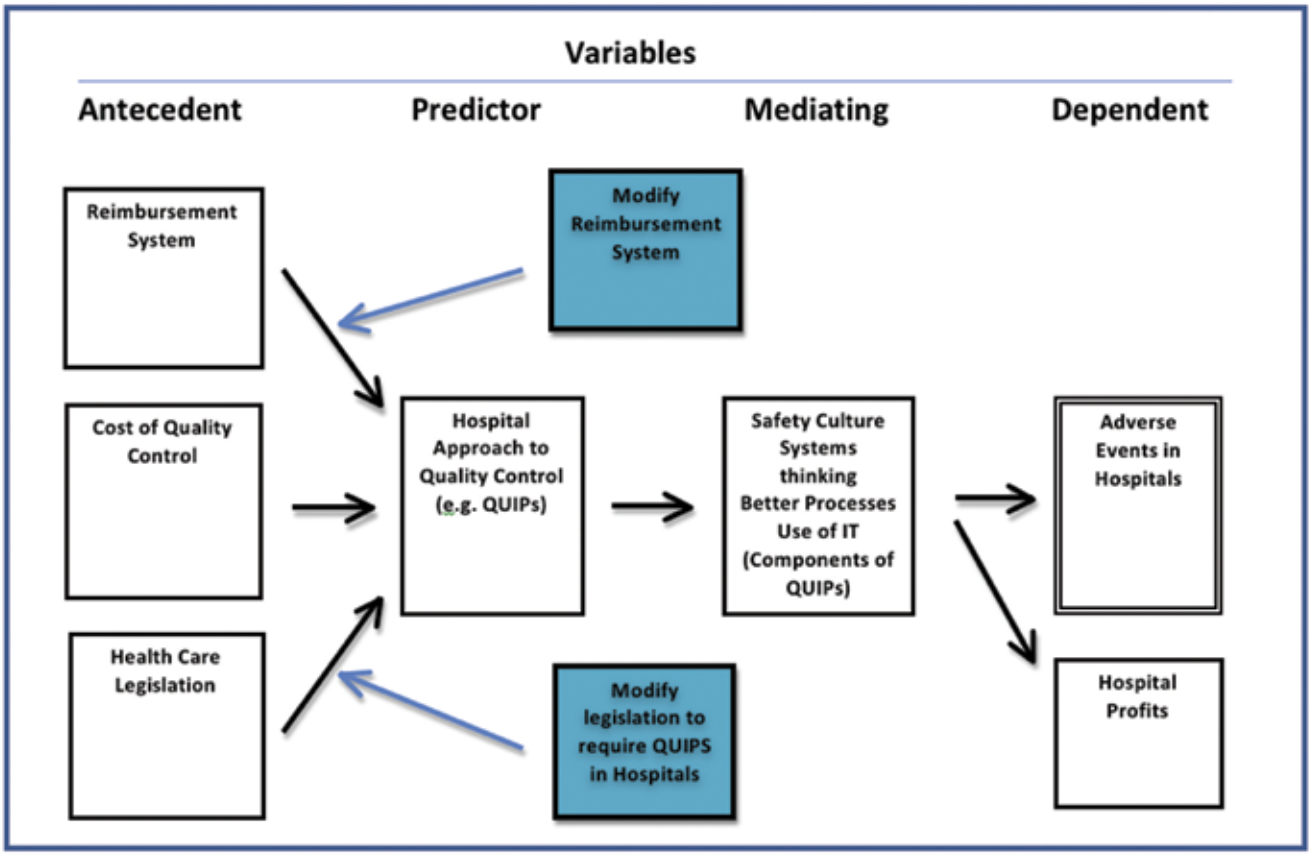

Figure 1: Conceptual Model for Decreasing Adverse Events: Two of the three antecedent variables are the main drivers for the predictor variables and thus are critical points for intervention (in blue). Double outlined box refers to primary outcome of interest (dependent variable). QUIPs = Quality Improvement Programs, IT = Information Technology

home with your loved one in a coffin, because the wrong dose of medicine was administered, is a shattering experience. In this day and age, such events occur 98,000 times a year. These many deaths would be equivalent to those caused by 20 Boeing 747 jumbo jets crashing every month and killing every passenger on board. If 20 Boeing 747 jumbo jets were indeed crashing every month, it is certain that the United States National Transportation Safety Board (NTSB) would immediately ground all Boeing 747s and provide the resources to take immediate action to fix the problem. The problem of AEs is similarly huge and effective action should be taken to combat this epidemic of preventable deaths. The application of Economic Efficiency theory, or striving for Pareto efficiency, could provide the necessary incentives to prevent AEs in the United States and the Middle East.

Theoretical Application

Pareto efficient allocation of resources is achieved when "the only way to make one individual (or more) better off is to make another individual (or more) worse off"[9, 10]. However, achieving Pareto efficiency requires the following stringent, market conditions: a) that both sellers/buyers fully understand the goods, b) that both are price- takers, and c) that all prices are known to all participants[9]. Clearly, health care transactions in the United States (US) and the Middle East, do not meet these conditions – and in such cases moving towards Pareto efficiency requires an external force[9, 10]. Thus the solution to adverse events (AEs) lies in two approaches. First, making all key players – patients, healthcare providers (healthcare teams and hospitals), and healthcare payers (private/government insurance) "better off", and second, creating an external force that encourages critical players to decrease AEs.

AEs increase the cost of health care, but hospitals are adept at externalizing these costs[11] and thus consider implementation of the necessary quality improvement programs (QUIPs) that decrease

These many deaths would be equivalent to those caused by 20 Boeing 747 jumbo jets crashing every month and killing every passenger on board.

AEs[12] an unnecessary financial burden. In fact, perversely, errors keep patients in hospitals longer and provide more revenue under the current fee-for-service model in the US. In the current climate, implementing QUIPs benefits patients and healthcare payers but makes healthcare providers "worse off". However, now, two things are changing: first, reimbursement rules are beginning to penalize hospitals for AEs and second, there is clear evidence that QUIPs not only decrease AEs, but actually improve profits for hospitals[12, 13]. Thus, the solution lies in moving towards Pareto efficiency because

now all three players can be made "better off" by instituting QUIPS and reducing AEs. Still, only 25% of the 6000 hospitals in the US engage in such QUIPs[13]. Thus, legislation (an external force) which imposes stricter penalties for AEs and requires QUIPS in all hospitals will provide the last nudge necessary for hospitals to decrease the epidemic of AEs in the US. It would be critical for countries in the Middle East to consider, early on, such penalties for excessive numbers of adverse events and to develop legislation that requires institution of QUIPs. If this is done early in the development of their respective healthcare systems it would be immensely beneficial.

Determinants of Adverse Events (AEs)

Crafting effective interventions that solve the public health problem of AEs requires an accurate knowledge of the determinants of AEs. A Conceptual Model (Figure 1) which describes antecedent, predictor, and mediating variables, provides a pictorial representation of determinants, causality, and interventions. The various components of QUIPs (such as safety culture, use of IT, etc.) are designated as the mediating variables[6, 12] while the pivotal predictor variable is the hospitals' approach to AEs (in this case willingness to implement QUIPs). In turn, hospitals' approach to address AEs is determined primarily by the antecedent variables delineated in Figure 1. These antecedent variables are the critical determinants and are mainly economic and political.

The economic determinants have thus far wielded influence on hospitals mainly through the reimbursement system (government insurance, private insurance). This system provides no financial incentives for the hospitals to reduce AEs. The Joint Commission (JC) of the United States realized in 1986 that QUIPs were necessary to decrease the significant morbidity and mortality associated with AEs[14]. However, in the absence of any financial incentives and guiding legislation, the hospitals have had no reason to address the problem of AEs. In fact, hospitals actually have an economic incentive not to implement such QUIPs for two reasons. First, hospitals are very adept at externalizing (to third party payers) the extra costs incurred by AEs (e.g. costs due to increased length of stay, extra medications, increased morbidity and mortality, etc.)[11]. Second, keeping patients in the hospital longer because they suffer an AE means even more revenue for the hospital under the fee-for-service reimbursement system. In effect, the hospitals are being financially rewarded for AEs[11, 13]. Thus, the reimbursement system, a major economic determinant of hospitals' reluctance to reduce AEs, is too lax and permissive. It came to be that way because of the strong political lobbies of the healthcare industry.

The political determinants of AEs are complicated and healthcare legislation, some parts of which affect AEs, has historically been very contentious in the United States[15]. These political debates are steered by ideological fervour and parochial interests of strong political lobbies such as the American Medical Association (AMA), Health Insurance Association of America (HIAA) or American Health Insurance Association (AHIA), and the American Hospital Association (AHA), to name a few[15]. The cumulative result of these political forces was legislation which created a healthcare system that provided more financial rewards for delivering more "health care" – regardless of the quality of health care being delivered. Predictably, this also led to an exponential rise in healthcare costs and, as a respected historian has pointed out, "a better way to exponentially inflate the cost of health care could not have been devised"[15]. As an example, between 1965 and 1970, federal and state health expenditure increased at a staggeringly, unsustainable rate of 20.8% per year[15, 16]. In a nutshell, the medical profession and allied stakeholders historically lobbied aggressively for legislation that provided public aid to health care, but without public control, without regard to any systematic control on quality of care provided, and without reasonable limits on reimbursement[15, 16]. Clearly, these political forces had much to gain from the status quo.

Multiple factors such as the increasing US debt, relative decrease in tax revenues, cuts in Medicare and other federal programs, and the realization by private health insurance that their model is in fact broken, eventually created a political climate that allowed passage of the Patient Protection and Affordable Care Act (PPACA) – part of which attempts to link reimbursement to patient outcomes and funds studies on quality outcomes[17, 18]. Thus, political forces, manifested by legislation and regulations, are now beginning to support demands that hospitals should provide good quality care without taking advantage of the reimbursement system. Countries in the Middle East that are developing their healthcare infrastructures are, currently, in a position to avoid all these costly experiments by creating a reimbursement system that incentivizes providers to minimize adverse events, improve patient safety, and decrease costs.

It would be critical for countries in the Middle East to consider, early on, such penalties for excessive numbers of adverse events and to develop legislation that requires institution of quality improvement programs. If this is done early in the development of their respective healthcare systems it would be immensely beneficial.

Interventions

The linkage of some reimbursements to quality of care by CMS, only within the past two years, was a good start, but had no significant "bite" to it – reflected by the fact that only 25% of the 6000 hospitals have thus far implemented QUIPs[13]. The Office of the Inspector General has drawn attention to this lack of interest by hospitals[17] and has urged CMS and legislators to provide more compelling incentives for hospitals to comply in order to decrease AEs, save lives, and save money.

If CMS reimbursement rules were strict-

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er, hospitals would be unable to externalize the extra costs of AEs, thus making it attractive to implement QUIPs. As it turns out, recent and very good scientific evidence indicates that decreasing AEs not only saves lives but also increases revenues for the hospital[12, 13]. Thus, hospitals now have a financial incentive to address AEs. Now, all three players, patients, hospitals, and payers can benefit from the implementation of QUIPs. However, a century of resistance to change by the medical profession and allied stake holders has created a political and economic inertia that slows down progress in adequately addressing patient safety (AEs). It would be apparent to the most cursory observer that it is illogical for hospitals to not implement QUIPs if hospitals, and all other players, benefit financially and save lives at the same time. A stride towards Pareto efficiency is indeed possible.

Thus the following is proposed for countries in the Middle East: 1) Pass legislation requiring all hospitals to institute QUIPs within a short but reasonable period of time. This will address inertia and the political determinants. 2) Change the reimbursement system and stop paying for patients who suffer AEs and reward the reduction of AEs. The compelling quadriad of decreased AEs, saved lives, increased revenues for hospitals, and saving of public monies should convince legislators and payers to implement these stricter regulations, which will represent a turning point in the evolution of health care not only in countries in the Middle East, but any other country developing its healthcare infrastructure. MEH

> Countries in the Middle East that are developing their healthcare infrastructures are, currently, in a position to avoid all these costly experiments by creating a reimbursement system that incentivizes providers to minimize adverse events, improve patient safety, and decrease costs.

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– The views expressed in this article are those of the author and do not necessarily represent the views of the institutions for which Dr Khan has worked or currently works.

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Roundtable Talks

Improving healthcare workforce education and training in the Middle East

– challenges and strategies

Houston Methodist Global Health Care Services and *Middle East Health* magazine jointly hosted a roundtable discussion at the Ritz Carlton DIFC, Dubai on 31 October 2013 in association with the American Business Council. The objective of this event was to discuss the evolution of healthcare workforce education and training in the region; highlighting the challenges involved in developing this area as well as potential strategies to improve education and training. Twelve healthcare leaders from different areas of the healthcare industry including regulatory agencies, hospitals, and pharmaceutical and technology related companies participated in the dialogue. Following are some of the highlights of the thought-provoking discussion.

The Discussion

Dr Sarper Tanli, Vice President of Houston Methodist Global Health Care Services for the Europe-Middle East-Africa (EMEA) region, welcomed the panelists and distinguished guest Cathy Easter, President and CEO of Houston Methodist Global Health Care Services in Houston, Texas.

The roundtable discussion was moderated by Dr Sarper Tanli who used leading questions to direct a relatively informal and free flowing discussion among the panelists. The discussion was opened by Cathy Easter who highlighted the importance of workforce education and training for Houston Methodist, not only domestically but for its global partnerships; particularly as it relates to workforce development and sustainability.

Dr. Sarper Tanli:
The first topic relates to the challenges associated with developing the workforce; as regional health care experts, what do you feel are the main challenges of developing and retaining a quality healthcare workforce in the region?

Dr. Abdulrazzaq Al Madani:
In the UAE, a large proportion of staff are recruited from abroad due to the underdevelopment of the national workforce. Hiring staff from abroad is the only way to attract the best staff for the hospitals but demand for quality staff is high everywhere in the world so it is challenging. Staff retention is also a problem with institutions having to offer incentives such as higher salaries, accommodation and other privileges to retain their employees.

Dr. Abdul Karim Saleh:
Trying to develop a national workforce and retain a predominantly expatriate workforce is a challenge. In terms of developing a national workforce, we've come a long way; we've experienced a significant transformation of events recently in Abu Dhabi in terms of fast forwarding our residency paying initiatives

The Host and Moderator

ATTENDEE	COMPANY NAME	TITLE
Dr. Sarper Tanli	Houston Methodist Global Health Care Services	Vice President, EMEA

The Panelists

ATTENDEE	COMPANY NAME	TITLE
Cathy Easter	Houston Methodist Global Health Care Services	President and CEO
Dr. Mahmoud Al Yamany	King Fahad Medical City	Chief Executive Officer
Dr. Mohamed AbdulRazaq Nasaif	Dubai Health Authority	Head Professional Development Center - Department of Medical Education
Dr. Amer Sharif	Dubai Healthcare City	Managing Director of Education and Training
Dr. Abdul Karim Saleh	Sheikh Khalifa Medical City	Chairman of Education
Prof. Sehamuddin Galadari	UAE University	Professor at UAE University, Board Member for Dubai Healthcare City Authority (DHCA)
Prof. Gita Ashok Raj	Gulf Medical University	Provost
Dr. Abdulrazzaq Al Madani	Dubai Health Authority	Chief Executive Officer, Consultant Physician and Endocrinologist Dubai Hospital
Dr. Nayzak Raoof	American Hospital	Chief Medical Officer
Dr. Zeydan Abuissa	Pfizer	Country Manager of Gulf and Levant
Lauren Arnold	UAE Nursing Council	Advisor
Peter DeBenedictis	GE Healthcare	Marketing Director - Middle East & Pakistan

to a new standard of graduate medical education. Our hospitals have gained institutional and program level accreditation within a frame of 12-18 months and we now have about 17 programs that are accredited by the Accreditation Council for Graduate Medical Education, which is a Chicago-based institution. We're on the right track but there are still some obstacles and challenges to overcome.

Dr. Mahmoud Al Yamany:
In Saudi Arabia in general, there is a lack of flexibility within government-funded or public hospitals compared to the private sector. The public healthcare system pays doctors as salaried physicians, whereas in the private sector, doctors are paid per the number of patients they see which is an incentive to increase productivity. It is also very difficult to retain the experienced practitioners in the public sector. We need to create a system that pays by performance within the public sector and reduce dependency on the physicians at their peak who are the most expensive and most highly targeted by the private sector.

Prof. Sehamuddin Galadari:
It is important to emphasis we are discussing the healthcare workforce in general as there are big challenges to be overcome for the non-clinical and support staff as well as the physicians.

A fundamental problem is the lack of an academic center within our healthcare facilities. Having educational and academic institutions alongside hospitals is important; we need to focus on both developing our current workforce but also preparing those in the pipeline. This benefits the institution by providing better education


Dr. Sarper Tanli


Cathy Easter


Dr. Mahmoud Al Yamany


Dr. Mohamed AbdulRazaq Nasaif


Dr. Amer Sharif


Dr. Abdul Karim Saleh


Prof. Sehamuddin Galadari


Prof. Gita Ashok Raj


Dr. Abdulrazzaq Al Madani


Dr. Nayzak Raoof


Dr. Zeydan Abuissa


Lauren Arnold


Peter DeBenedictis

Dr Mahmoud Al Yamany speaks at the Roundtable

and therefore better clinical service and provides a platform to engage those people coming through the system.

Dr. Sarper Tanli:
One concept used in the US is 'education homes', combining classroom-based education with practical work experience. Medical centers take the lead on this, but they are seen as a pool of available resources to be provided by different institutions, but coordinated under one umbrella.

I would like to focus now on targeted training pathways and programs and how these can help achieve healthcare workforce efficiency.

Prof. Gita Ashok Raj:
We are starting to focus on the development of other healthcare professions not only physicians. We have just finished developing programs for technicians, nurses, health information management, nutritionists and dieticians for example. Healthcare has become much more of a team-based healthcare delivery system.

It is now acknowledged that training is a continuous process. The College of Allied Health Sciences have developed a set of courses which they feel are common to all health professions involving elements such as critical thinking, problem solving skills, and communication skills, which are now being incorporated into the curriculum. These provide a training base before moving on to the more specialized training, in laboratory sciences for a laboratory technician or imaging sciences for radiology etc. Ultimately this will result in people working together more collaboratively and eventually improve the quality of healthcare delivery.

Dr. Mohamed AbdulRazaq Nasaif:
Education and training is a [non-monetary] area that attracts a lot of valuable people. For the younger physicians coming in we have a residency program which is improving every year. There are also other programs run by the Department of Medical Education within DHA plus the DHA facilities themselves which over the years have developed considerably. We are also working on bringing further education to nursing, administration and public health which are all areas we need to develop.

Lauren Arnold:
Is anyone aware of anything innovative happening around retention aside from salary and benefits packages?

Dr. Mohamed AbdulRazaq Nasaif:
We are using the concept of the private sector, which is pay per performance, to increase salaries. This is not necessarily new but the concept of performance-related incentives to top up salaries has been received well by the employees.

Dr. Nayzak Raoof:
As a strategy, we are trying to move away from paying fixed salaries to physicians due to the high costs to recruit some of the specialties. We have developed more of a fee for service model, essentially dividing the charges between the hospital and the physician. This works well in specialties like primary care and surgery but does not work as effectively in supporting specialties such as pathology and radiology so here we pay a base salary plus an incentive. I would say that physicians are the least of our problems; retaining staff such as technicians, nurses, and support services is probably more challenging.

One of the biggest challenges that we have is the lack of available, qualified workforce in the local market. Recruiting from outside the UAE is a very tedious and costly process for any institution. In addition there are no regulations or guidelines that cover the payment model for healthcare workers.

Prof. Sehamuddin Galadari:
Monetary benefits are obviously a major factor but training is also an important tool to attract and retain staff. Much of the healthcare workforce would rather work in a place with good training opportunities. However, due to much of the workforce coming from abroad, and with many using the UAE as a means to get to Europe or the US, their time in the UAE is always going to be relatively short term.

Lauren Arnold:
Does anyone currently measure employee satisfaction? Has the staff themselves identified areas, other than salary, that would make them more satisfied and more retainable?

Dr. Amer Sharif:
In our experience an employee's boss and the organization's leadership plays a role.

Dr. Nayzak Raoof:
In terms of retention, salary is top followed by the leadership and their relationship with their direct boss.

Dr. Zeydan Abuissa:
There are three areas we are working on: Pfizer Voice which is a global survey measuring 'engagement, the inclusive environment and retention'; a management effectiveness survey; and a retention program which we have developed locally. As you know. in the UAE and Gulf there is no retirement scheme so we have created a new system where Pfizer allocates an employee a certain amount of money which is invested, the cost of which is borne by the company. We are also working on an end-of-service indemnity which increases in line with certain performance criteria, and length of service.

Peter DeBenedictis:
Leadership is a key driver for retention. At GE we have moved from a primarily service-orientated model to more of a partnership with our customers. Over the years we have extended our training opportunities to our customers particularly in the healthcare sector. The greatest demand is for leadership training since healthcare professionals receive in depth technical training, but little focus on leadership skills and developing elements such as change management, lean sigma, process improvement, etc. We've

seen great results in the region both in terms of employee retention and improvement in patient care as a result of driving these elements within the organization.

Dr. Sarper Tanli:
Patient safety is a key concern in most healthcare institutions. How do you think the use of training and education can be optimized to improve patient safety and quality in your organization?

Lauren Arnold:
The UAE Nursing and Midwifery Council was developed three years ago through a decree to set standards for education, practice and regulation. There are a number of guidelines and frameworks that we're looking at to set standards nationally for a positive practice environment, such as the Magnet program in the US and similar programs around the world. We've just issued the UAE Nursing and Midwifery strategic plan for education and also standards for educational institutions to adhere to. One of the most important aspects of this is to establish more specialty programs for nurses.

Nursing and midwifery education in the UAE and across the GCC has evolved dramatically over recent years. Many hospitals use standards whether it's magnet or another body to reshape how the practice environments are organized, but it's just beginning. The schools are starting to teach more leadership content and more practice content that focuses on team work rather than professional isolation and that's really important.

Prof. Sehamuddin Galadari:
One problem that we have had is that in terms of building the national workforce, there is still some stigma associated with people joining the field. So there has to be positive education and clear career guidelines.

Dr. Nayzak Raoof:
I believe there is a requirement that graduates are not allowed to practice in Dubai unless they are nationals because they need two years' experience before they can be licensed. What are we achieving if we are training people that cannot practice?

Lauren Arnold:
There are some regulatory hurdles to be overcome to build a strong workforce. We have just conducted a policy analysis looking at all of the policy decisions across the UAE that prevent the expansion of a nursing workforce and we hope to use this to have a productive dialogue with the regulators.

This country imports most of its nursing workforce and most would agree that these nurses should be experienced. However, we are now graduating a number of Emirati and non-Emirati nurses locally who can't possibly have any experience as fresh graduates. We are asking the regulators to recognize that we must grant them the opportunity to have a job so they can gain that experience and we are starting to see progress here. There are a lot of barriers we can solve through productive dialogue.

Dr. Amer Sharif:
Speaking specifically about the two years' experience regulation we tackled this by allowing local graduates to go through a period of on-the-job training which paid less than the average salary for the role. It satisfies the legality of employing somebody without experience and helps the individuals gain the experience they need.

Cathy Easter:
From the US perspective we have a similar concept. We are able to hire new graduates, so that's not a regulatory hurdle. However, the fact is our graduates are not really qualified to provide direct patient care so what we've done is firstly, we will only hire new people that have a four-year degree from the medicine perspective, which has been an enormous success factor for us by raising the standards of care. We have also put a very robust graduate nurse curriculum in place so that from a leadership perspective, people know what's expected of the new graduates versus the existing nurses. It also helps them gain that experience and expertise, similar probably to your on-the-job training so that they are of incredible value to us organizationally.

Dr. Sarper Tanli:
Dr. Amer you are running an amazing training and education center in DHCC and collaborating with a lot of institutions conducting training and education programs, what do you see happening in this area?

Dr. Amer Sharif:
The governments and authorities should invest significantly in career advancement opportunities right from the beginning. We need to develop institutions that provide on-the-job training, internships, career advancement opportunities, residencies, fellowships and so on. Without this our healthcare services will not improve.

At the Mohammed Bin Rashid Al Maktoum Academic Medical Center, we are looking at the gaps in the system. For example, one of the first programs established was the postgraduate dentistry program. This country develops a lot of undergraduate dentists through Ajman College and Sharjah University, but there are few career advancement opportunities, hence the graduate dentistry school was established.

We have also established the simulation center and the Al Maktoum Medical Library electronic resources. We are now looking at the core educational components, supporting the authorities, academic institutions and government bodies and looking at how we can add value to the workforce, in Dubai, the UAE and regionally.

Dr. Sarper Tanli:
There is a lack of positions dealing with new diseases or diseases that we encounter a lot here, such as diabetes. Diabetes is very prevalent yet we do not have enough qualified diabetes educators in this country.

Dr. Abdulrazzaq Al Madani:
Through the Emirates Diabetes Society we have tried to build up the area of diabetes education. We graduated more than 130 diabetes educators through programs in conjunction with the International Diabetes Federation and the University of UAE in Al Ain and the University of Leicester from the UK, all of whom were certified. However, there is no such career as a diabetes educator in many institutes, which is something I've been fighting for in DHA [Dubai Health Authority] and in Abu Dhabi.

Prof. Sehamuddin Galadari:
There are multiple aspects to this since there may not be regulations in place to license the educator.

Dr. Sarper Tanli:
Can we now focus a little on continuous professional education (CME)? How can we put regulations around it, how can we use the new technique of simulation training effectively and how can we maintain patient safety and training standards as new technology comes through?

Dr. Nayzak Raoof:
The DHA has already put legislations in place concerning CME and you cannot practice unless you fulfill this requirement. However, we need more activities to be available locally.

Dr. Abdul Karim Saleh:
It is the same in Abu Dhabi; physicians are required to meet a minimum of 50 CME hours per year. In terms of safety, obviously safety is the backbone of education everywhere and the prime focus for all accreditation surveys. However, most of these accreditation services focus on process rather than outcomes. Regulations should be more outcome-oriented and that may add value in terms of patient safety.

Dr. Mohamed AbdulRazaq Nasaif:
There is a lot of scope for expansion but the number of applications we receive for CME accreditations in the UAE is increasing year on year. Many are internal events, but there are an increasing number held by groups such as the Emirates Medical Association and different conference organizers that are open to the public. This is definitely an area of growth in Dubai.

Dr. Sarper Tanli:
In terms of CME hours most gulf countries set a minimum number of hours of CME training per year; however, there is no connectivity to privileging. How can we link our CME to privileging and enhance the skill sets of the workforce to positively affect outcomes?

We can then move on to our next topic which centers on the expanding role of simulation in the healthcare training environment. I would be interested to hear how the integration of simulation impacts the development of medical staff in your organization?

Dr. Nayzak Raoof:
There is a level of discrimination in terms of physician qualifications depending on the country of certification. For example,

the US Board of Certified Physicians is more scrutinized than others and has a recertification process in place that is not required in Europe. The American graduates feel that the system is unfair as they are being put under more pressure due to the tighter US guidelines.

Cathy Easter:
Could you link this back to medical staff privileging, meaning regardless of country of origin you have to be recertified periodically?

Dr. Nayzak Raoof:
The challenge comes due to the processes involved. A US board qualified physician would need to travel to the US and sit a recertification exam. In Germany there is no recertification system so how are we going to recertify this physician here in Dubai at the hospital?

Dr. Mahmoud Al Yamany:
Until last year I chaired the Accreditation Privileging Committee for King Fahad Medical City and in practice a board certified physician would not be asked to recertify provided that they maintain their seat and CME hours. Every program has a defined set of privileges associated with it and anything outside this requires a minimum level of additional training. In addition, privileging is reviewed every three years and any procedure that the physician did not practice; or disease entity they did not work on in that time drops out of their privileges. However, there are a lot of procedures that physicians don't get to see on a regular basis. Simulation could bridge this gap, which is what drove us to build the 'virtual hospital' which is basically an entire building being designed to carry out simulations, so that healthcare providers can be trained on procedures or continue to practice them in order to receive or maintain their privileges.

Dr. Amer Sharif:
We have established a similar 'virtual hospital' in the Mohammed Bin Rashid Al Maktoum Academic Medical Center and I think simulation is key for a lot of clinical specialties. Regarding CME I agree that we need to focus on outcomes; we need to look at the gaps in the skills of our workforce and focus on these. Moving away from CME, we can learn a lot from the strong education and postgraduate structure that has strengthened the Saudi system. The Saudi Commission for Specialties has been instrumental there; Oman has also taken on board the experience of Saudi; Bahrain is setting up a similar program; and we've signed an MOU with the Saudi Commission. I also think it is very important for us to establish a robust education system that links the public and private sectors.

Dr. Sarper Tanli:
It sounds like we would like to create a system to integrate education and training and put it together for any healthcare professional to utilize, connected to cre-

dentials and privileging. We also need to look at the benefits of simulation training versus traditional lectures and training programs. How can healthcare institutions help address the problem of proficiency training and make use of simulation technology?

Dr. Abdulrazzaq Al Madani:
Conferences are a good way to refresh knowledge and receive training; there are usually workshops run alongside the conference program designed to improve the skills of the participants. In Dubai we have many such conferences and workshops. Gaining CME hours for these conferences is an incentive for the medical staff to attend and improve their skills.

Peter DeBenedictis:
One thing we're introducing to the region is online learning. We have a library of 350 courses, which are certified in the US, but the main challenges we have encountered are getting the students to register for such courses, and ensuring that what they've learnt is actually being put into practice.

Dr. Sarper Tanli:
Another tool we've been using for the last few years is interactive video web conferences. Unfortunately, most of those conferences are accredited in the US. We need to create an easier way to accredit these conferences locally to provide the best opportunities to our physicians.

Prof. Gita Ashok Raj:
At Gulf Medical University our Health Communication Division hosts all the conferences and seminars and workshops, which are organized by the colleges. All the colleges are encouraged to organize at least one annual conference or two workshops.

We also have our own internal monthly events which include: a journal club related to clinical care or healthcare, a journal club for medical education, a clinical society meeting and research presentations. These events are accredited either by HAAD, MOH in Dubai or DHA. We also have an annual scientific meeting in November. Our faculty is also encouraged to attend external conferences.

Dr. Sarper Tanli:
It is important to emphasize that we are beginning to see more focus on simulation training, although in its infancy compared to the technology available, and in the future I feel that online training will also be utilized more.

I would now like to discuss financing. There are obviously dollars being spent so the question is what proportion of healthcare spending should be spent on education and training; is it enough, how do we use it, who should be the one financing it, and who coordinates it?

Prof. Sehamuddin Galadari:
Healthcare is big business, and you have to think long term. The shortsighted view would be why waste money on training, I should hire another doctor to get more patients. However, retention is key and there is nothing more valuable than loyalty. Thinking long term I would invest at least a third of my budget on education and training, because I know there will be a return on my investment.

Dr. Zeydan Abuissa:
I worked in Pfizer France for 12 years where it is law that 2% of revenues should be allocated by any organization for training and development which is a huge amount. I feel the UAE has done a great job in building international and global benchmarks in many industries such as hospitality but not in healthcare and I think we have to ask ourselves why healthcare is not viewed as an industry that attracts capital. We need to change this mindset. The UAE GDP is in the range of $350 billion, the second largest GDP in the Arab world after Saudi Arabia, yet only 3.7% or 3.3% is invested in healthcare whereas in the US they invest well over 10%

Dr. Mahmoud Al Yamany:
It's actually 19% of the GDP in the States, not 10%...

Cathy Easter
…and it's an unsustainable amount.

Dr. Mahmoud Al Yamany:
That is a different issue; healthcare provision versus training within healthcare. We spend anywhere between 5% - 7% of our total budget on training but that includes education as part of the scholarships, etc. The point is, I as a CEO cannot retain certain categories of employees and one example is nursing. They tend to move through the tertiary care hospitals in Saudi Arabia to the Far East and to the Far West where they get citizenship. They're not going to stay in Saudi Arabia no matter what I do. Yet this is not their fault as the system does not allow them to stay.

Dr. Abdulrazzaq Al Madani:
If we could work on the retirement system, and on social security, we would stand a better chance.

Dr. Mahmoud Al Yamany:
I couldn't agree more. But the problem is, if you give me the option of retiring in Saudi without citizenship, or retiring in Ireland as an Irish citizen, then the answer is obvious. I think we need to capitalize on focused training opportunities that encourage employees not to look for other opportunities so we can keep them within our institution for as long as we can. We need to make the individual feel that the institution is giving something back.

Peter DeBenedictis:
Middle Eastern countries are facing global scarcity issues and that's not going to change. Training is not going to stop them leaving in the long run. GPs are probably one of the scarcest groups globally and it's only getting worse as time goes by; it's a big challenge to retain them because they are a skill that is needed globally.

Dr. Mahmoud Al Yamany:
I think training has its place, but once you reach retirement age it's a different story. When we think of retirement in KSA, it's for Saudi nationals only. A private pension scheme offered to non-nationals might be an incentive to keep staff.

Dr. Amer Sharif:
It would not be so bad if we lost these valuable staff to the local market rather than abroad as is often the case. The market here is small and to be able to hire from within the Emirates instead of

bringing somebody from abroad would be highly beneficial. It becomes very expensive to continually hire from outside.

Dr. Abdulrazzaq Al Madani:
If you want to improve the service you are giving to your customer, you have to improve the standard of your employee. Even if their length of service is short by training them we will improve the standard of care we can provide in that time. Even if they go, I benefited from the years that they stayed. So in the healthcare system, I believe continuous education is a must. If you don't do regular training you are outdated and cannot treat your patients properly.

Conclusion

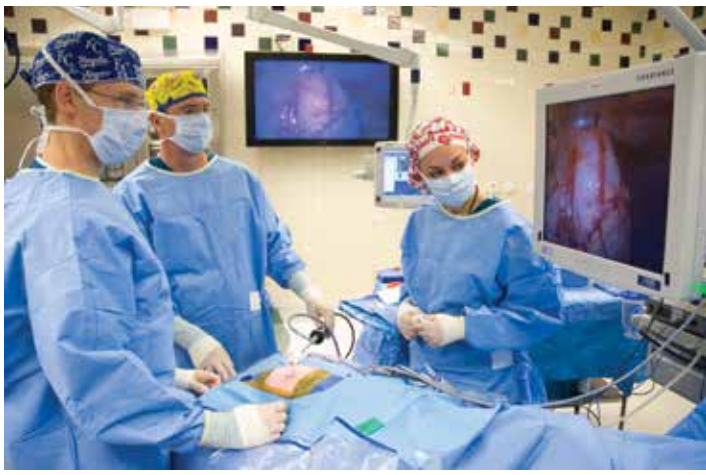
The session was concluded by Cathy Easter who summarized her thoughts on the discussions by saying: "I think this brought a lot of thoughts together and I think one of the things I took from this is around incentivizing; I think you do have obvious workforce challenges and so you might want to start thinking around the incentives for your non-physician caregivers as well. From experience, when we strongly wanted to improve our patient satisfaction scores one of the things we ended up doing was providing a quarterly incentive that was non-executive, non-physician, to everyone else in the organization – people who sweep the floors, change the linens, provide the direct care from the nursing perspective, the therapy side, and by sharing those successes financially, on a quarterly basis, we were able to really unite people.

"Most people don't go into healthcare because it is a strong industry, but because they want to take care of people. At any rate, I do think often it's creating a set of incentives that can create better retention. I think training and education are great incentives, so perhaps utilize those more strategically, because it sounds as if you have a lot of them, but some of them may not be of the same value add proposition.

"Another positive thing that I heard is you have a lot of opportunities to create this system. You don't have a system that you have to now go back and re-tool, and you have a lot of the people, whether on this table or clearly around other tables that you can really spend some energy, effort and get some things going in the right direction and in very measurable ways. I do think the metrics piece is key, healthcare is in some ways, whether we like it or not, a business, but to use a term from the States – 'No money, no mission'. You can't stay in business, you can't take care of people if you really don't have the bottom line to be able to do that. So you have to continue to keep that in focus and strategically overlay some of these other things and, since it is a business and hopefully one that is successful, sharing back that wealth with people that will create incentives and rewards around the things you are trying to meet.

"I thank you all for giving me the opportunity to participate in this really exciting conversation".

Dr Sarper Tanli thanked all attendees for a valuable discussion and for sharing their views on such a wide range of topics from workforce incentives and retention strategies, the importance of allied health and nurse development through to continuing medical education and privileging. MEH



Minimal incisions, maximum outcomes

By **George W. Holcomb III**, MD, MBA
Surgeon-in-Chief; Director, Center for Minimally Invasive Surgery; The Katharine B. Richardson Endowed Chair in Pediatric Surgery; Professor of Surgery, University of Missouri-Kansas City School of Medicine

At the Children's Mercy Center for Minimally Invasive Surgery, children, including the tiniest of patients, receive the latest and most effective procedures in minimally invasive surgery. Our state-of-the-art surgical facility is especially equipped to perform pediatric laparoscopic, thoracoscopic and other minimally invasive techniques, which result in less postoperative discomfort and minimal scarring.

The Center for Minimally Invasive Surgery (cmhmis.com) was established in 1999 at Children's Mercy Hospital, located in Kansas City, Missouri (USA), to highlight our emphasis on the laparoscopic and thoracoscopic approaches for common as well as unusual surgical problems in infants and children.

Over the past 14 years, more than 10,000 minimally invasive operations have been performed. A number of common operations such as laparoscopic appendectomy, fundoplication, gastrostomy, and cholecystectomy are performed each day. In addition, less common diseases such as achalasia, inflammatory bowel disease, Hirschsprung Disease, esophageal atresia and fistula, congenital diaphragmatic hernia, and pulmonary parenchymal masses are also approached using the minimally invasive surgical (MIS) technique. Our center was one of the early pioneers in the use of the laparoscopic approach for fundoplication and the thoracoscopic approach for esophageal atresia.

Center for Prospective Clinical Trials

As one of the largest pediatric minimally invasive surgery programs in the United States, we're also leading the development of best practices that have the potential to influence the care of children around the world.

In 2003, our surgeons began prospective randomized clinical trials in order to better counsel our families regarding the advantages and disadvantages of either the MIS approach or the open operation. Our first study compared 200 infants (100 in each arm) undergoing either a laparoscopic or open operation for pyloric stenosis (Ann Surg 2006;244:363-370).

A number of other randomized clinical trials have followed completion of that initial study, including trials investigating the operative and postoperative management for appendicitis, one study comparing fibrinolysis vs. thoracoscopic decortication for empyema, and several studies looking at whether or not the esophagus should be mobilized significantly during a laparoscopic fundoplication.

Finally, two of these prospective trials have investigated the use of single site umbilical laparoscopic surgery (SSULS), and compared the single site approach to the traditional three- or four-port laparoscopic operation for appendectomy and cholecystectomy. A quality of life survey was presented at the 2013 American Pediatric Surgical Association (APSA) meeting indicating an improved cosmetic benefit for the single site approach shortly after a SSULS appendectomy when compared to the traditional three-port appendectomy, but this cosmetic advantage is no longer present at two years following the operation (Accepted, J. Pediatr Surg).

These studies are conducted through our Center for Prospective Clinical Trials under the direction of Shawn St. Peter, MD. More information on our trials is available on our website at *cmhclinicaltrials.com*.

Center for Pectus Excavatum and Pectus Carinatum

In addition to the emphasis on laparoscopy and thoracoscopy as operative approaches for a number of surgical conditions, the surgeons at Children's Mercy also have a large experience with the minimally invasive repair (Nuss procedure) for *pectus excavatum*. More than 500 patients have undergone this operation at our Center for Pectus Excavatum and Carinatum (*cmhpectus.com*) with extremely good results, and over 15 manuscripts have been published regarding our experience with the Nuss operation. Also, for the past two years, the surgeons within this pectus center have begun to employ dynamic bracing for managing children with *pectus carinatum*, and more than 300 patients have been seen and evaluated to date. There has not been the need to perform a single *pectus carinatum* operation since dynamic bracing was initiated.

Contact Us

To learn more about how we can partner with you to improve the lives of your patients, contact International Services at +1-816-701-4524 or send an email to *international@cmh.edu* MEH

St. Luke's Medical Center performs first successful adult fecal microbial transplant

St. Luke's Medical Center, in conjunction with The University of Texas School of Public Health in Houston, has successfully treated its first patient with a fecal microbial transplantation (FMT). The procedure was led by a team, including Herbert L. DuPont, MD, MACP, lead clinical investigator; F. Lyone Hochman, MD as the patient's gastroenterologist; and Zhi Dong Jiang, MD, DrPH, laboratory investigator, who prepared the FMT.

The FMT procedure was performed in September 2013 and follow-up treatments have helped relieve the symptoms of CDAD (Clostridium Difficile Associated Diarrhea or C diff) in 47-year-old Patricia Melancon of Liberty, Texas.

"The procedure was not difficult," said Melancon. "Five days after the procedure, it was the best I've felt in the last year."

CDAD or C diff is increasing dramatically in hospitals and nursing homes throughout the United States, Canada, and Europe. The intestinal infection causes severe diarrhea and can lead to kidney failure and/or death. Studies have shown that C diff-associated deaths in Texas have tripled over the past decade.

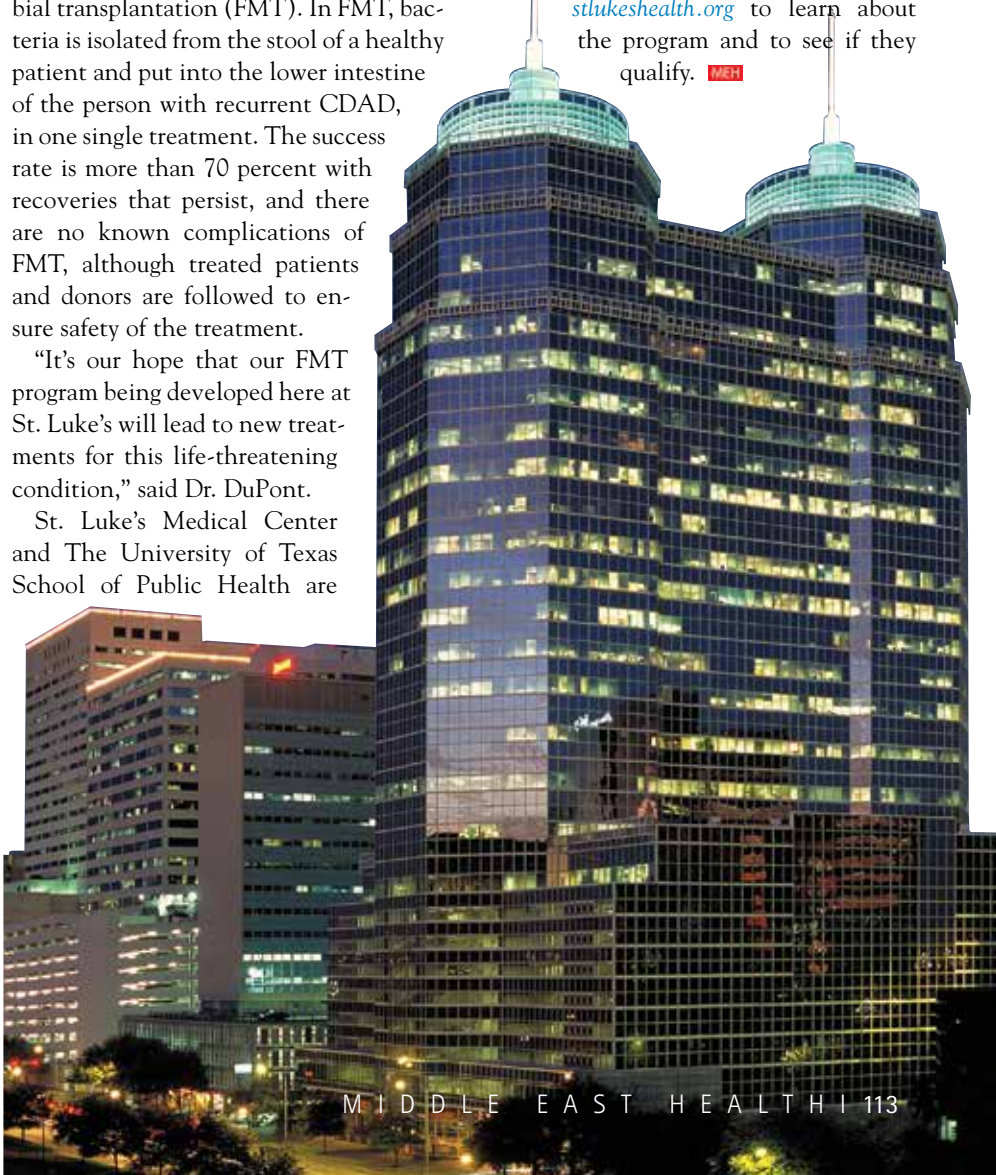
"Estimates suggest that we have 300-400 patients in Houston, and more than 1,700 patients in Texas, with this chronic intermittent disease. It leads to a miserable existence and requires recurrent hospitalization," said Dr. DuPont. "A Fecal Microbial Transplant is the only effective way to give these patients back their everyday, normal lives."

When a patient is first diagnosed with CDAD, antibiotics are used for treatment. After two or more recurrences, antibiotics usually are not helpful. Because the diversity of their microbiome – the good bacteria in the intestines – is reduced, a repletion of this good bacteria (or bacterial flora) is required for a cure. Currently, the only effective way to re-establish bacterial flora is the fecal microbial transplantation (FMT). In FMT, bacteria is isolated from the stool of a healthy patient and put into the lower intestine of the person with recurrent CDAD, in one single treatment. The success rate is more than 70 percent with recoveries that persist, and there are no known complications of FMT, although treated patients and donors are followed to ensure safety of the treatment.

"It's our hope that our FMT program being developed here at St. Luke's will lead to new treatments for this life-threatening condition," said Dr. DuPont.

St. Luke's Medical Center and The University of Texas School of Public Health are working together to develop an FMT program to treat patients with refractory & recurrent CDAD.

- People with chronic diarrhea from CDAD can contact St. Luke's International Service at 832-355-3350 or email us at *stlukeinternational@stlukeshealth.org* to learn about the program and to see if they qualify. MEH



Researchers explore strategies to develop new technologies for fighting antibacterial resistance

"Antibiotic resistance threatens a return to the pre-antibiotic era". The World Health Organisation uses this strong expression when referring to a phenomenon that is rapidly spreading: the increasing resistance of microorganisms to antimicrobial medicines, such as antibiotics. WHO estimates indicate that the excess mortality due to resistant bacterial hospital infections exceeds 25,000 every year, in Europe.

"Nowadays, if you acquire an infection in a hospital, it is extremely rare for the infecting bacterium to not be resistant to multiple antibiotics," says Australian microbiologist Harold Stokes, research director at the ithree institute, University of Technology, Sydney (UTS).

The trouble is that antibacterial resistance is not fully understood. Recent research has shed some light into the resistance mechanism. Jordi Garcia-Ojalvo and Pau Rué, researchers previously based at the Polytechnical University of Catalunia, in Barcelona, Spain, where they were members of a team that developed a 2-D model of the biofilms formed by Bacillus subtilis, a soil bacterium which forms spores to tolerate extreme environmental conditions.

"When the colony of bacteria is under stress," says Rué, "wrinkle structures in the biofilm conveying resistance to the colony are formed."

The formation of these structures is initiated by massive spatially self-organised cell death, they observed. "With our simulation, we demonstrated that these patterns result from interaction between extracellular matrix production and cell death,"Rué says, adding: "without a matrix, cells die all together, no wrinkles are formed and no resistance occurs." This finding could therefore help understand how bacteria develop resistance to external agents.

There are many attempts to tackle bacteria resistance. One team focuses on developing antibacterial textiles, for example. Bulgarian born chemist Tzanko Tzanov, also from the Polytechnical University of Catalunia, has developed a technology to make sanitary fabric aseptic. This strategy is based on the use of a combination of zinc nanoparticles, enzymes and ultrasounds. The research is part of EU-funded SONO Project, aimed at the development of a sonochemical process for the production of medical antibacterial textiles.

Like silver, zinc has a strong antiseptic effect. While the fabric is immersed in the water, ultrasounds cause bubbles containing zinc oxyde nanoparticle to explode and the particles to be embedded in the textile.

"We use enzymes that improve the adherence of the particles, and biopolymers that improve the antibacterial effect," explains Tzanov. "The combination of biopolymers, nanoparticles and enzymes results in an extraordinary adherence – which resists 70 high temperature laundry cycles – and in a better antimicrobial effect." The idea is to produce hospital gowns or linen to help prevent the spreading of resistant bacteria.

Some experts believe this approach could have some use, as long as it is limited to hospitals. "This technology needs to be evidence-based studied to see how effective it really is, but it may help to reduce the microbial load in a hospital," says Harold Stokes.

According to the Australian microbiologist, the risk of using these antimicrobial agents outside a nosocomial environment is high.

"There are several examples where the broad use of antibiotics has favoured a large increase in resistant genes in bacteria. Horizontal gene transfer, by which bacteria are able to transfer genetic material to an entire population, favours the spread of resistant genes to many pathogenic bacteria. My concern is that the wholesale spreading of this technology for use for non-medical purposes might foster resistance. Antibiotics and antimicrobials should only be used in a hospital context. The same applies to this technology."

Nowadays, if you acquire an infection in a hospital, it is extremely rare for the infecting bacterium to not be resistant to multiple antibiotics.

Other experts have further reservations, despite the quality of the results. "The antimicrobial results of this technology are good," says Annalisa Pantosti, an expert of microbial resistance from the Italian National Health Institute ISS, in Rome. "Yet, I have doubts on its actual efficacy for the nosocomial infections," she says. "In a hospital, the transfer of bacteria may occur because of the hands of the staff, for not properly sterilized medical devices, or for infection of chirurgical sites during the operations." She believes current protocols provide for disposable gowns and masks, and therefore such textiles cannot help much. She concludes: "Consider that the WHO emphasises that the single intervention that can significantly lower nosocomial infections is very simple: washing hands." – youris.com

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Earliest marker for autism found in infants

Study finds attention to others' eyes declines in 2 to 6-month-old infants later diagnosed with autism

Eye contact during early infancy may be a key to early identification of autism, according to a study funded by the US National Institute of Mental Health (NIMH), part of the National Institutes of Health. Published 6 November 2013 in the journal *Nature*, the study reveals the earliest sign of developing autism ever observed-a steady decline in attention to others' eyes within the first two to six months of life.

"Autism isn't usually diagnosed until after age 2, when delays in a child's social behaviour and language skills become apparent. This study shows that children exhibit clear signs of autism at a much younger age," said Thomas R. Insel, M.D., director of NIMH. "The sooner we are able to identify early markers for autism, the more effective our treatment interventions can be."

A 5-month-old infant participates in eye-tracking research. A decline in eye fixation reveals signs of autism present already within the first 6 months of life

Typically developing children begin to focus on human faces within the first few hours of life, and they learn to pick up social cues by paying special attention to other people's eyes. Children with autism, however, do not exhibit this sort of interest in eye-looking. In fact, a lack of eye contact is one of the diagnostic features of the disorder.

To find out how this deficit in eye-looking emerges in children with autism, Warren Jones, Ph.D., and Ami Klin, Ph.D., of the Marcus Autism Center, Children's Healthcare of Atlanta, and Emory University School of Medicine followed infants from birth to age 3. The infants were divided into two groups, based on their risk for developing an autism spectrum disorder. Those in the high risk group had an older sibling already diagnosed with autism; those in the low risk group did not.

Jones and Klin used eye-tracking equipment to measure each child's eye movements as they watched video scenes of a caregiver. The researchers calculated the percentage of time each child fixated on the caregiver's eyes, mouth, and body, as well as the non-human spaces in the images. Children were tested at 10 different times between 2 and 24 months of age.

By age 3, some of the children – nearly all from the high risk group – had received a clinical diagnosis of an autism spectrum disorder. The researchers then reviewed the eye-tracking data to determine what factors differed between those children who received an autism diagnosis and those who did not.

"In infants later diagnosed with autism, we see a steady decline in how much they look at mom's eyes," said Jones. This drop in eye-looking began between two and six months and continued throughout the course of the study. By 24 months, the children later diagnosed with autism focused on the caregiver's eyes only about half as long as did their typically developing counterparts.

This decline in attention to others' eyes was somewhat surprising to the researchers. In opposition to a long – standing theory in the field-that social behaviours are entirely absent in children with autism – these results suggest that social engagement skills are intact shortly after birth in children with autism. If clinicians can identify this sort of marker for autism in a young infant, interventions may be better able to keep the child's social development on track.

"This insight, the preservation of some early eye-looking, is important," explained Jones. "In the future, if we were able to use similar technologies to identify early signs of social disability, we could then consider interventions to build on that early eye-looking and help reduce some of the associated disabilities that often accompany autism."

The next step for Jones and Klin is to translate this finding into a viable tool for use in the clinic. With support from the NIH Autism Centers of Excellence program, the research team has already started to extend this research by enrolling many more babies and their families into related long-term studies. They also plan to examine additional markers for autism in infancy in order to give clinicians more tools for the early identification and treatment of autism.

doi:10.1038/nature12715 MEH

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The Nebraska Medical Center offers advanced treatment options using ocular imaging technology for diagnosis and management of Primary Intraocular Lymphoma

Serious Medicine. Extraordinary Care.

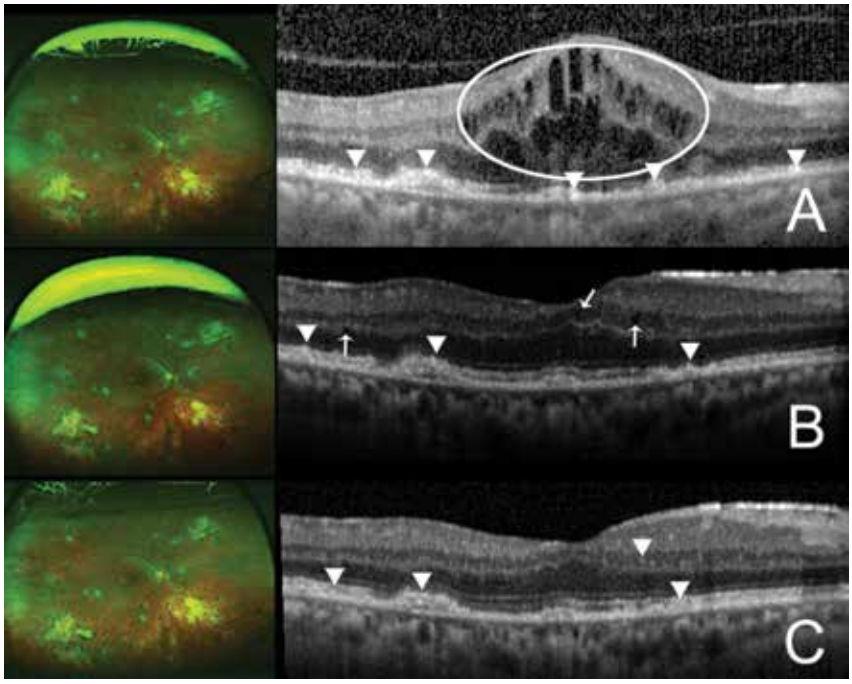
That has always been the motto for the University of Nebraska Medical Center/ The Nebraska Medical Center ("TNMC"). And certainly the specialists and researchers at TNMC are doing everything to maintain such reputation in the area of uveitis and intraocular lymphoma.

In 1929, Percival Bailey first coined the term primary central nervous system lymphoma (PCNSL). Since the entry of PCNSL into the world of medical literature, countless medical advances regarding its pathogenesis, diagnosis, and prognosis have resulted.

Yet, during the past eight decades , PCNSL is still bound to a harrowing prognosis, as relapsing CNS lymphoma has one-year overall survival of 25-40%. PCNSL is the second most common intracranial mass lesion. It is highly prevalent in the human immunodeficiency virus (HIV)-infected population – a population which continues to expand in the Middle Eastern and North African regions.

However, advances in the diagnosis of one subset of PCNSL – primary intraocular lymphoma (PIOL) – are proving to be pivotal to the early detection of eyes with PIOL and allowing the physician to preserve sight in such eyes by initiating early therapy. PIOL is a rare non-Hodgkin's lymphoma, which consists of large B-cells. While PIOL may represent a mere 1% of the non-Hodgkin's lymphomas, 1% of intracranial tumors, and less than 1% of intraocular tumors, 60-80% of PIOL cases eventually develop CNS involvement.

"The diagnosis of PIOL itself was considered to be very difficult for a long time due to its masquerading features and low incidence," explains Quan Dong Nguyen, MD, MSc, McGaw Memorial Endowed Chair in Ophthalmology, Inaugural Director of the Truhlsen Eye Institute (TEI). "Chief patient complaints typically consist of blurred vision and floaters without painful or red eyes; however, clinical manifestation varies among patients. PIOL also masquerades as infectious, non-infectious, or idiopathic inflammation of the eye and often even responds to corticosteroid therapy, thus contributing to the diagnostic challenge," Dr. Nguyen expands further.



Longitudinal wide-angle color fundus photographs (P200 Tx, Optos, Inc.) on the left and spectral domain optical coherence tomography (OCT, Spectralis, Heidelberg Engineering, Inc.) on the right of a patient with primary intraocular lymphoma. (A) First day of presentation: fluid in the retina is circled on the OCT. Arrowheads indicate hyper-reflective signals on the retina (photoreceptor layer, PRL, and retinal pigment epithelium, RPE, layer). OCT scan was performed before the diagnostic vitrectomy. Color fundus image is from Day 14 following vitrectomy. (B) Day 19: the arrows indicate intraretinal fluids on the OCT. Lesions on the PRL and RPE are pointed. (C) Day 77: hyper-reflective signals on the RPE pointed by the arrowheads on the OCT have arguably thickened. Hyper-reflective signals are also seen in the inner retina. An arrowhead points to an example in the inner nuclear layer of the retina.

However, several advanced imaging techniques are now being utilized to help diagnose and follow patients with PIOL. "We are employing most if not all of them, even those techniques in development" says Yasir J. Sepah, MBBS, Director at TNMC. There are several techniques that have been used to evaluate patients with suspected PIOL. Fluorescein angiography is useful for monitoring the changes

in the size of hypofluorescent lesions. Indocyanine green angiography also reveals hypofluorescent lesions, although it is not as sensitive as fluorescein angiography.

"Now, spectral-domain optical coherence tomography (SD-OCT) may be employed to assess the degree of lymphoma infiltration. SD-OCT findings of distorted retinal layers and hyper-reflective signals in the forms of bands and nodules have recently been reported by our team and may further help in early identification of eyes with PIOL, especially in cases where there is no CNS involvement. The Figure illustrates the course of a patient with PIOL managed by Dr. Nguyen. The diagnosis was missed by two comprehensive ophthalmologists and two retina specialists before Dr. Nguyen established the critical findings which led the patient not only able to learn of the diagnosis of PIOL but also subsequently of CNS lymphoma. Such proper diagnoses have certainly saved the patient's sight and also life. We have conducted extensive research on this subject and have published various seminal scientific papers in this area. And, we apply what we have learned from the OIRRC to the patients who are being examined at TEI, providing those who are suspected to have PIOL or those with atypical uveitis with the most comprehensive evaluation," states Dr. Sepah.

Although treatment is individualized for each case of PIOL, systemic methotrexate and rituximab are currently considered to be first-line therapy. The affected eyes may be radiated in addition to systemic and intravitreal chemotherapy. Improvement with local and intrathecal chemotherapy has also been reported. In some patients, autologous stem cell transplant following high-dose chemotherapy has been shown to be effective.

PIOL is a highly malignant neoplastic disease with poor prognosis. "To improve the outcome, early diagnosis and appropriate treatments with careful monitoring are necessary," emphasizes Diana V. Do, MD, Vice Chair for Education and Director at TNMC "The masquerading features and low incidence of PIOL make the diagnosis quite challenging," Dr. Do reiterates.

Nizar Mamdani, executive director of the TNMC's International Healthcare says, "Our researchers and specialists are great examples of the caliber of specialists and researchers working tirelessly to help provide better lymphoma treatment options. Through strategic collaborations in 44 countries, we provide innovative treatment options for cancercare and transplantation to patients around the world", says Mamdani. TNMC also provides customized training and educational programs for specialists, nurses and allied healthcare professionals.

● Contact: *nmamdani@nabraskamed.com*
www.unmc.edu/international

The Only #1 Hospital for 23 Years Straight

The Rehabilitation Institute of Chicago (RIC) has once again been named the #1 rehabilitation hospital by *U.S. News & World Report* – a recognition unmatched by any hospital of any kind anywhere in the United States.

RIC provides fundamentally different care than any other hospital, serving the largest number of the most complex patients and treating a wide range of conditions from stroke, traumatic brain injury and spinal cord injury to cerebral palsy, cancer related conditions and other neurological disorders. Each year they treat over 50,000 patients from more than 70 countries throughout the world.

The world's best research directly impacts recovery

The future of medicine is the integration of researchers, scientists and clinicians working together in the same space. RIC is leading this future with the development and implementation of their new 'AbilityLab™'. This innovative model of care allows the staff to share findings with patients and their care team in real time enabling them to solve problems faster and achieve greater outcomes.

RIC holds an unparalleled research distinction with a record eight, multi-year, multi-million dollar federal research designations. Currently there are also more than 350 clinical studies underway dedicated to improving treatments and creating better outcomes for patients. Highlights of a few include:

- **Bionics** – *New England Journal of Medicine* recently published a paper on the world's first thought- controlled bionic leg. Developed by an integrated research team at RIC, this leg learns and performs activities unprecedented for any leg prosthetic.
- **Robotics Lab** – RIC uses assistive devices to facilitate finger extension, grasp and hand recovery. Used with clinical therapists in a virtual reality environment, researchers are advancing new treatments for stroke patients affected by hand weakness and paralysis.
- **Non-Invasive Brain Stimulation** - This technique tests whether brain stimulation reduces inappropriate nerve impulses to the injured side of the brain, ultimately improving hand and arm movements.
- **Motion Analysis Center** – Monitoring and analyzing gait and upper extremity function during daily activities enables researchers to assist patients with cerebral palsy, spina bifida, spinal cord injury, and many other conditions.

> All medical centers say that they marry research and patient care, but very few are willing to make the enormous investments and changes – including physical design changes – to make that happen. The design of the new hospital removes the barriers that prevent sharing across large complex organizations. – **W. Zev Rymer, MD, PhD, Vice President of Research at RIC**

The Ability Institute of RIC – Opening 2017

This year marked a historic milestone in the history of the Institute as they broke ground on their new research hospital. Scheduled to open in early 2017, many believe that this is more than just a new hospital – it's a whole new way of looking at medicine. It will establish a new paradigm of translational research and clinical care and an extraordinary unification of researchers, clinicians, patients and technology. Five new Innovation Centers will be established within the hospital that will each apply new and promising treatments to help improve and eliminate the effects of impairments in the human brain, spinal cord, nervous system and limbs in adults and children. These innovation centers will focus on the dominant organ-system and its molecular and cellular basis of function and recovery. By focusing on how cells and organs respond to interventions designed to promote movement, function and medical recovery, they will advance knowledge, create new standards and disseminate these findings across the world. AbilityLabs™ will also be created to further infuse 21st biomedical science into the clinical environment and align therapies with core functionalities: Think & Speak, Arms & Hands, Legs & Walking, Coordination & Endurance and Pediatrics. To learn more about the new hospital or how you can be a part of bringing this vision to life, visit their website at: *www.advancehumanability.org*.

- **RIC's Global Patient Services** department is available to help answer your questions and support your patient referrals. For more information, visit *www.ric.org* or to speak with one of our GPS representatives about making a patient referral call +1.312.238.1188 or email: *international@ric.org* MEH

Ali's journey back to health

When 13-year-old Ali Al-Mammari arrived at the University of Chicago Medicine last summer, he could barely walk due to his severe sickle cell anemia. He ambled down the hallway with a cane, his hips and shoulders locked, with a look of excruciating pain on his young face, despite the medication he was taking.

"At home, he would lie on his bed crying in pain," said his father, Mohammad Al-Mammari. "He was sad he couldn't do things, and we were in the emergency department constantly trying to get him some relief."

Three months after receiving a bone marrow transplant at the University of Chicago Medicine Ali returned home to the United Arab Emirates no longer experiencing debilitating pain, but rather was running, riding a bicycle and playing soccer.

"He was so much more mobile when he left than when he arrived," said Kelly Kramer, advanced practice nurse for the pediatric bone marrow transplant program at the University of Chicago Medicine Comer Children's Hospital. "And he no longer had any pain. Although he spoke very little English, I could tell he was progressing just by looking at his face."

Today, the cheerful 14-year-old is back to being a young teen, ready to enter seventh grade, loves math and dreams of being a fighter pilot. "He is doing all the things his friends can do," said his physician John M. Cunningham, MD, director of hematopoietic stem cell transplantation and chief of pediatric hematology/oncology. "I visited him in January and Ali is doing well."

Ali's sickle cell anemia was challenging in that he had two problems: constant and severe pain, and blocked hips, said Cunningham. This uncommon, inherited disorder can cause problems ranging from moderate discomfort to profound, lasting pain, widespread tissue damage, stroke and death. Ali had the most severe form of the disease; it had taken over his life.

In collaboration with his physicians in Abu Dhabi, plans began to bring Ali to Chicago for treatment that would improve his quality of life. When the family arrived, Cunningham's team determined that Ali was indeed a good candidate for a bone marrow transplant. And there was even more good news: "He was lucky that Omar, his 12-year-old brother, was an ideal donor," said Cunningham.

"Omar was very cooperative and wanted to help his brother," said Al-Mammari. "Having a match with his own brother made it special. We were very happy."

The Center for International Patients assisted the family with all their needs, arranging translation services, transportation and accommodations while in Chicago. "The Center's staff also gave us moral support and helped build trust and understanding with the medical staff," said Al-Mammari.

After the transplant and two months in the hospital, Ali needed to regain his strength and coordination. He received that help at the Rehabilitation Institute of Chicago (RIC), where his treatment included daily exercises, therapy sessions and age-appropriate function goals, such as dribbling a ball so he could play soccer again.

"Although it is rare for patients with sickle cell disease to need a transplant, our team has performed more than 40," said Cunningham. "Few programs worldwide have as much experience. Besides sickle cell disease, we care for children and young adults with high-risk leukemia, lymphoma and other genetic diseases. We have a highly experienced and sophisticated team to handle these tough cases."

The Al-Mammari family has high praise for the University of Chicago Medicine's staff and especially their physician, Dr. Cunningham. "He is one-of-a-kind and very much like part of our family," said Al-Mammari. "Not only is he a great doctor, but he's a wonderful human being and really like another father to my son Ali." MEH

Regulated medical waste management for the 21st century

By **Richard W. Gilpin,** , Ph.D., RBP, CBSP, SM(NRCM)-Emeritus
President, R. Gilpin, Limited

Biomedical laboratories, hospitals, non-hospital healthcare sites and manufacturing sites generate medical waste that may contain biohazardous microorganisms or materials perceived by the public as potentially infectious.

Organizations have a duty to minimize the impacts of medical waste disposal in the 21st Century.

Onsite disposal of medical waste satisfies these goals:

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- Liability avoidance
- Reduction of institutional health and safety hazards
- Environmental protection
- Regulatory compliance
- Community relations

Onsite disposal of medical waste is a national goal. "The Congress hereby declares it to be the national policy of the United States that pollution should be prevented or reduced at the source whenever feasible; pollution that cannot be prevented should be recycled in an environmentally safe manner whenever feasible; pollution that cannot be prevented or recycled should be treated in an environmentally safe manner whenever feasible; and disposal or other release into the environment should be employed only as a last resort and should be conducted in an environmentally safe manner." (Pollution Prevention Act of 1990. Public Law 101-508, 1990).

As a microbiologist that participated in the scientific validation of the first field deployment of the Red Bag Solutions medical waste processing technology at Johns Hopkins University, I am confident that this technology will continue to set the benchmark in the 21st Century.

This steam or ozone technology provides the most cost effective and environmentally friendly solution for dealing with medical waste, blood products, sharps containers and other biohazardous waste products. It diverts up to 100% of regulated medical waste from landfills and repurposes the waste into secondary fuel sources and recycling programs including waste to fuel.

Red Bag Solutions is the only treatment technology that simultaneously grinds and sterilizes medical waste with no hazardous chemicals, negative air emissions or odors. Volume is reduced up to 90% and weight by up to 30%, enhancing an organization's sustainability initiatives. The processed waste is ground into a confetti-like material that is guaranteed sterile and unrecognizable. The sterilized waste can be placed directly into the facilities compactor as ordinary municipal trash. There are also several recycling options that can result in additional savings, while further reducing the amount of material sent to a landfill. The RBS approach is safer for patients, employees, and the community. With onsite destruction of infectious waste, medical facilities can greatly reduce their cradle to grave liability for biohazardous material since only municipal trash leaves the facility, and all paper or electronic confidential patient information is rendered totally unreadable during the process.

This steam or ozone technology provides the most cost effective and environmentally friendly solution for dealing with medical waste, blood products, sharps containers and other biohazardous waste products. It diverts up to 100% of regulated medical waste from landfills and repurposes the waste into secondary fuel sources and recycling programs including waste to fuel.

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The use of ColActive Plus and ColActive Plus Ag in the management of acute and chronic wounds

By **Louise Jackson**

Rashid Centre for Diabetes and Research (RCDR), a United Arab Emirates Ministry of Health Organisation (MOH), managed and operated by Swedish Global Health Partner (GHP) is a specialised tertiary Diabetes Centre in Ajman. The foot clinic at RCDR treats UAE National's with acute and chronic diabetic foot ulcers. The clinic has been using ColActive Plus and ColActive Plus Ag in the management of acute and chronic wounds which may have arrested in the cellular phase of closure. The attributes of the collagen matrix product that make it so effective for wound healing are; it keeps granulation tissue moist, it has Dual-MMP inhibition capability, fast acting, capable of maintaining optimal moisture balance and inhibits microbial growth.

I use this collagen product because it has the following properties; ease of application, does not stick to the skin, fast acting, pain free and is an effective antimicrobial dressing which can target a wide range of microorganisms. ColActive Plus Ag contains ionic silver for broad spectrum antimicrobial activity which lasts for up to 6 days, therefore helping to reduce bioburden through the patented bioactive matrix and promote wound closure. The dressing contains carboxymethylcellulose (CMC) and alginate. The alginate provides absorption allowing the dressings to remove excess exudates from the wound bed whilst maintaining the optimal moisture balance for wound healing. The open binding sites exposed to MMP's readily bind to the wound dressing and digest the dressing as opposed to the healthy tissue unlike other protease modifying dressings. Other collagen dressings do not have the binding sites exposed and so therefore the MMP proteases are unable to bind to the dressing.

RCDR's mission and vision is to improve the quality of life for diabetes patients in the UAE by combining compassionate, modern diabetes care, ColActive Plus is aligned to this mandate as it is a leading, modern collagen dressing containing both CMC and alginate which none of the other leading collagen dressings contain together.

Louise Jackson is a Podiatrist and Head of The Foot Clinic at RCDR. She is a founding member of the Emirates Foot and Ankle Club.

Prior to moving to the UAE Louise worked at leading London hospitals and clinics in the public and private sector; Chelsea and Westminster and St Mary's Hospital, Chelsea Consulting Rooms and Portobello Clinic Notting Hill. MEH

Analysts say there is urgent need for action to reverse impact non-communicable diseases are having on GCC economies

Failure to act could result in economic burden of $68 billion by 2022

Rapid economic advances in the Gulf Cooperation Council (GCC) countries have led to the population adopting a sedentary lifestyle. The result is a rising incidence of non-communicable diseases (NCDs), such as cardiovascular illnesses, cancer and respiratory diseases. NCDs have become the leading cause of death in the GCC. And, their prevalence – which is at epidemic levels – is undermining the societal gains stemming from economic development. In fact, with current prevalence rates, the total direct and indirect cost of the most common NCDs for the GCC will be close to US$36 billion in 2013 – one and a half times official healthcare spending. Given the magnitude of the problem, GCC governments must act rapidly. *Analysts at Booz & Company* suggests they must develop national and GCC-wide NCD agendas that will enact short-term and long-term pro¬grams before the epidemic imposes a heavy toll on their societies.

The economic development of the GCC countries has brought with it a significant cost – a rising incidence of NCDs. In effect, in little over a generation, GCC countries have improved their standards of living from developing country levels to those of advanced economies.

Non-communicable diseases have been linked to developed economy lifestyles, namely bad eating habits, high-sugar and fat-heavy diets, and a lack of physical exercise. Increasing wealth has, of course, had positive public health effects, such as funding large-scale public health awareness and vaccinations campaigns to tame the threat of communicable diseases, such as polio, measles, rubella, and others. However, in the GCC, as elsewhere, these gains to public health and individual well-being are now being offset by the increasing prevalence of NCDs and associated mortality rates.

"The result is that NCDs have become the leading causes of death and dis¬ability, thus making the GCC one of the region's worst affected by the global increase in chronic diseases," said Gabriel Chahine, a Partner with Booz & Company. "This trend is projected to result in NCDs causing over three-quarters of all deaths globally by 2030, up from 63% in 2008, with significant cost implications for healthcare systems."

A chronic problem

NCDs, also known as chronic diseases, impose a tremendous human and economic cost; their generally gradual development negatively affects individuals' quality of life, diminishes their ability to contribute economically and drains healthcare resources.

Booz & Company's perspective focuses on five of the most common NCDs in the GCC, which were taken from the 14 NCDs listed by the WHO's Global Burden of Diseases study.

Although diverse in symptoms, the five NCDs highlighted share common lifestyle-related or behavioural risk factors such as tobacco use, a fat-heavy diet, and physical inactivity:

- Cardiovascular diseases are responsible for 29% of deaths from NCDs globally.
- Malignant neoplasms cause 13% of global NCD deaths.
- Chronic respiratory diseases contribute to 7% of global NCD deaths.
- Neuropsychiatric conditions are responsible for 2% of NCD deaths worldwide.
- Diabetes mellitus cause 2% of NCD deaths around the world.

Economic burden

The economic burden of NCDs comes in two cost forms, direct and indirect.

"Direct costs are typically those associated with the treatment of patients, such as consultations, medications, and clinical operations," added Jad Bitar, a Partner with Booz & Company. "More significant is the indirect economic penalty that NCDs impose. From a national perspective, NCDs reduce life expectancy, which means less output. In addition to the immense burden on the patients, NCDs also affect the patients' families, causing them to contribute less to economic activity. Chronic illness and shorter life spans deplete the quality and quantity of the work force."

Moreover, labour productivity is diminished because workers are less effective. Similarly, NCDs lead to increased absenteeism, because of work missed due to sick days.

Booz & Company used Harvard–WEF's Cost of Illness approach to measure the direct and indirect costs of NCDs in the GCC. The Cost of Illness method is comprehensive and relies on tangible data. Booz & Company also collected data from local ministries, centres of statistics, and regional reports linked to the selected NCDs from all six GCC member states.

By developing an econometric model using the Cost of Illness model and the latest available and reliable statistics, Booz & Company was able to generate estimates for the direct and indirect costs of NCDs in 2013, and forecasts for the expected burden in 2022.

"We calculated that the total direct and indirect cost for the five selected NCDs in 2013 will be around $36 billion for the GCC, rising to around $68 billion by 2022," stated Chahine. "The burden is greater, and clearly less sustainable, when the total cost of NCDs is compared to healthcare spending. In 2013, the five top NCDs in the GCC will impose an economic penalty equivalent to close to one and a half times all six of the governments' healthcare budgets."

The economic burden per capita for the different GCC countries in 2013 will range from $516 in Saudi Arabia, or 3.6%


Pierre Assouad


Gaby Chahine


Jad Bitar

of non-oil GDP per capita, to $2,001 in Qatar, equivalent to 4.1% of non-oil GDP per capita. By 2022, the total cost per capita will reach $758 in Saudi Arabia and $2,778 in Qatar. The lowest economic burden will be in Oman, which, in 2022, will have a NCD per capita cost of $603. In comparison, in 2011 OECD economies spent $3,327 per capita on healthcare.

Tackling the issue

To tackle the crippling financial and human costs of NCDs, GCC govern¬ments and other stakeholders need to identify and understand the underlying risk factors associated with these illnesses.

"There are two kinds of primary NCD risk factors that are root causes of these illnesses: non-modifiable and modifiable, said Pierre Assouad, Senior Associate with Booz & Company. "In terms of policy responses, modifiable risk factors are the most amenable to change and have the highest impact on individuals. Non-modifiable risk factors lie outside the control of the individual and are linked to age, hereditary/genetic conditions and other socioeconomic, cultural, and environmental determinants."

Governments, through appropriate regulations and policies, can improve some non-modifiable risk factors, such as environmental influences, including toxicity levels of products and air quality. Modifiable risk factors are behavioural in nature and include tobacco use, physical inactivity and an unhealthy diet.

An effective strategy

"With risk factors growing and healthcare budgets already under strain, GCC governments need to sound the alarm within their societies and embark upon national programs to stem the NCD epidemic," said Bitar. "The goal of national programs that combat NCDs should be to disseminate positive behavioural messages that educate the population about imminent health risks, rather than to simply defensively focus on restraining the growing incidence of chronic diseases."

Assouad added: "GCC countries therefore need to urgently factor NCDs into their long-term health planning and they should aim for a better quality of life for residents, a reduction in unnecessary medical costs and improved productivity."

1. **Coordinate and educate**: Coordination is important because the nature and magnitude of the required interventions demand a centrally-led, collaborative effort involving key public and private stakeholders. Education is also vital to convince all stakeholders to accept the imperative of slowing the progression of NCDs; and education is the most effective tool for empowering patients and encouraging them to change their lifestyles.

2. **Prevent and cure**: In practical terms, any national strategy should tackle NCDs at two different levels – direct curative care or early disease management and prevention.

3. **Encourage structural and behavioural changes**: Preventative action to lower the prevalence of modifiable risk factors requires the development and implementation of a combination of short-term and long-term collaborative programs targeting structural changes as well as behavioural changes.

Short-term programs

Short-term programs should be rapidly designed and implemented by GCC governments. These efforts aim to alter or strengthen current structures to limit the impact of modifiable and non-modifiable primary risk factors. There are three main areas in which governments can make immediate changes: financial, regulatory and clinical.

– ***Financial***: *These measures financially reward, or penalize, individuals to reduce the impact of primary risk factors. This includes taxes on unhealthy products, such as fast food, soft drinks, and cigarettes, and subsidies for healthy ones, for example, healthy food at schools.*

– ***Regulatory***: *These measures involve adopting and enforcing rules and regulations that limit the availability and promotion of unhealthy products and ensure the availability of healthy alternatives in different settings, such as schools and government buildings.*

– ***Clinical***: *The aim of clinical measures is to leverage existing health services and infrastructure to limit the impact of primary risk factors. Clinical programs include comprehensive national screening programs to identify at-risk groups and to ensure early detection of NCDs.*

Long-term programs

Stakeholders should design and launch long-term programs in parallel to ensure continuity of effort and sustainability of results. Long-term programs typically focus on behavioral change at the individual level and at the healthcare system level, and may have an effect on regulations and funding. There are three types of long-term programs: youth, adult and professional.

– ***Youth***: *The aim of these programs is to educate teachers and others (e.g., sports coaches) who care for young people and can educate them on NCD risks and healthy lifestyles. These programs can shape the behavior of the young within schools and their communities.*

– ***Adult***: *Programs aimed at adults will focus on select audiences to improve their knowledge and ability to manage their conditions and to reduce the impact of primary risk factors.*

– ***Professional***: *The aim of professional programs is to sensitize health providers about NCDs and direct them toward resources they can use to prevent, detect, and treat such diseases.*

GCC countries must urgently take action to push back the rising tide of NCDs. Without comprehensive programs that enable better allocation of healthcare resources to treat the root causes of NCDs, as well as their symptoms, the human, the societal, and the economic burdens associated with these diseases will reach crippling levels. Governments will need to involve a wide array of public and private stakeholders in such programs to help create the optimal enabling environment for lifestyle changes. They should also implement screening programs for all NCDs and utilize the wealth of information collected to design more effective and targeted interventions. Programs to lower risk factors and better manage NCDs necessarily involve a degree of innovation and experimentation. With proper monitoring and measurement, successful schemes can be institutionalized, and lower-impact programs can be curtailed. Over time, investment of resources in effective programs dealing with NCDs should restrain the growth of GCC healthcare spending and improve the region's health landscape. MEH

Establishing the basis of humour

The act of laughing at a joke is the result of a two-stage process in the brain, first detecting an incongruity before then resolving it with an expression of mirth. The brain actions involved in understanding humour differ between young boys and girls. These are the conclusions reached by a US-based scientist supported by the Swiss National Science Foundation.

Since science has demonstrated that animals are also capable of planning into the future, the once deep cleft between the brain capacities of humans and animals is rapidly disappearing. Fortunately, we can still claim humour as our unique selling point. This makes it even more astonishing that researchers have considered this attribute but fleetingly (and have spent much more time on negative emotions such as fear), write the Swiss neuroscientist Pascal Vrticka and his US colleagues at Stanford University, in the journal *Nature Reviews Neuroscience*.

Strangely cheerful feelings

In their recently published article (*), the researchers demonstrate that, while laughter at a joke requires activity in many different areas of the brain, just two separate elements can be identified among the complex patterns of activity. In the first part, the brain detects a logical incongruity, which, in the second part, it proceeds to resolve. The ensuing feeling of cheerfulness arises from a brain activity that can be clearly differentiated from that of other positive emotions.

Moreover, in the study of 22 children aged between six and thirteen, the research team led by Vrticka showed that sex-specific differences in the processing of humour are formed early on in life. The researchers recorded the children's brain activity while they were enjoying film clips that were either funny – slapstick home video – or entertaining – such as clips of children break-dancing. On average, the girls' brains responded more to the funny scenes, while the boys showed greater reaction to the entertaining clips.

Benefits of improved understanding

Vrticka speculates that these sex-based differences could play a role in helping women to select a suitable (and humorous) mate. Aside from this, humour also plays a key role in psychological health. This is demonstrated, among other things, in the fact that adults with psychological disorders such as autism or depression often have a modified humour processing activity and respond less markedly to humour than people who do not have these disorders. Vrticka believes that an improved understanding of the processes that take place in our brain when we enjoy the effects of an amusing joke could be of great benefit in the development of treatments.

(*) Pascal Vrticka, Jessica M. Black and Allan L. Reiss (2013). The Neural Basis of Humor Processing. Nature Reviews Neuroscience, online.
doi:10.1038/nrn3566 MEH

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Expanding the boundaries of pediatric hand reconstruction and transplant surgery

By **Amir Taghinia**, MD
Plastic surgeon at Boston Children's Hospital's Hand and Reconstructive Microsurgery Program

Our hands are a vital part of how we interact with the world around us. From feeding ourselves to putting on our own clothing, hands are instrumental in many of our daily activities. But the hand is about so much more than just functionality. Whether you're expressing emotion through hand gestures or touching a loved one, our hands are often deeply involved in our social interactions, many of which help define us as people.

And unlike many of the organs and body parts treated in medicine, a patient's hands are often out in the open for everyone to see. As hand surgeons, we must always be conscious of this to ensure we are not only doing all we can to preserve or improve our patients' hand functionality, but doing so in a way that makes the hand as symmetrical as possible with the unaffected hand.

At Boston Children's Hospital's Hand and Reconstructive Microsurgery Program, we recognize that pediatric hand reconstruction goes beyond surgery and management of congenital or acquired hand deformities: complete care must support the social, emotional and psychological well-being of patients as well.

Combining training in adult and pediatric orthopedics, hand surgery, plastic surgery and microsurgery allows our clinicians to provide a comprehensive level of care unmatched in most other hospital settings. In addition, our patients have access to social workers, psychologists, psychiatrists, hand therapists and child life specialists, all trained to support the unique needs of children.

While we strive to provide the best treatments available to our patients, we also are deeply involved in the research of congenital hand deformities in hopes that our work will one day lead to universal improvements in the care of these conditions, benefiting patients across the globe.

Currently, Brian Labow, MD, a researcher and hand surgeon in our program, is spearheading research efforts to elucidate the genetic mechanisms that cause the congenital enlargement of digits of the hand or feet, or other limb overgrowth syndromes.

Through microarray analysis of four patients with macrodactyly, he and colleagues discovered that the growth factor pleiotrophin is an important modifier of this disorder (Lau et al 2012 PLOS One). Recently, collaboration between Labow and the laboratories of Matthew Harris, PhD, and Matthew Warman, MD, in Boston Children's Department of Orthopedics, was established to further this research. Using human genetic material and model systems of overgrowth in zebrafish and mice, they hope to uncover more clues behind the causes of macrodactyly and other overgrowth disorders to help inform patients and their families, and physicians treating the condition.

Pediatric hand transplant program

But no matter how far research refines and expands the treatment of congenital and trauma-related hand differences, there will always be children who cannot be helped by traditional therapies. To address the needs of these patients, members of Boston Children's Hand and Reconstructive Microsurgery Program and Pediatric Transplant Center have recently launched the world's only pediatric hand transplant program. The first adult hand transplant in the United States was performed in 1999, and since then more than 50 have been done on adults worldwide. However, thus far, there have been no transplants from a donor to a genetically different pediatric patient. But in recent years, medical knowledge, expertise and technology have evolved to a place where we are now able to offer this as an option to patients on a research basis.

The program is being performed under a research protocol, which will evaluate the safety and efficacy of bilateral hand transplantation in children. Data will be collected on patients to measure the outcomes of the procedure and the patients' progress for periods of 10 years or longer.

Boston Children's transplant team has extensive experience with solid organ transplants and immunosuppression. This strength, combined with our renowned hand surgery and rehabilitation team, extensive research capabilities and pediatric background gives us a unique opportunity to offer this experimental procedure to children who may benefit from it.

We value your input and look forward to partnering with you until every child is well. Please feel free to contact our Hand and Reconstructive Microsurgery Program or our Pediatric Hand Transplant Program at any time with comments, questions or ideas.

- Taghinia may be reached though Boston Children's International Health Services:
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Combination therapy shows early promise against stubborn leukemia

In early-stage studies, combining mTOR inhibitors with chemotherapy was far more effective against T-cell acute lymphoblastic leukemia (T-ALL) than stand-alone treatment, according to new research posted online by the Nature journal *Leukemia*.

Current treatments for T-ALL achieve about a 90 percent initial remission rate. But scientists are searching for improved therapy because relapses often occur, resulting in an overall survival rate between 60 and 70 percent.

"The disease comes back because of drug resistance that leads to relapse. Our study uncovers a way to enhance the effectiveness of chemotherapy," said Fukun Guo, PhD, study first author and a researcher in the Division of Experimental Hematology and Cancer Biology at Cincinnati Children's Hospital Medical Center.

The new study involved laboratory cell lines of human leukemia and mouse models of the disease. A key breakthrough came when the research team discovered that a molecular mechanism in the Fanconi anemia DNA repair pathway also appears to make T-ALL resistant to chemotherapy. This same pathway has been linked to drug resistance in other types of cancer, Guo says.

To block the FA repair pathway in leukemic cells, researchers tested three mTOR inhibitors currently under development – pp242, AZD8055 and INK128 – in combination with three chemotherapies – AraC, Etoposide and Cisplatin.

In one example highlighted by the researchers, mice treated only with pp242 or AraC died from their leukemia within 80 days. However, 75 percent of mice receiving combination treatment survived more than 100 days and 50 percent survived about 175 days.

Although laboratory results involving cell lines and mice do not necessarily translate to human treatment, the researchers say their findings suggest a new treatment strategy for T-ALL. Inhibition the FA pathway coupled with chemotherapy may also be useful against other types of cancer.

Guo and his collaborators are continuing their studies by developing "humanized" mice, which have been transplanted with patient cells of relapsed and refractory disease, to further test mTOR inhibitors in combination with AraG, another chemotherapy agent used clinically to treat T-ALL.

The disease comes back because of drug resistance that leads to relapse. Our study uncovers a way to enhance the effectiveness of chemotherapy.

Blocking a key protein may help treat aggressive form of leukemia

Targeting the RUNX1 protein – a transcription factor that helps regulate blood cell development – may provide a new approach to treating acute myeloid leukemia (AML), according to a study led by researchers at Cincinnati Children's.

The findings, posted in the *Journal of Clinical Investigation*, found that RUNX-1plays an unexpected role in supporting the growth of AML when the condition is fueled by fusion proteins.

"RUNX1 is generally considered a tumor suppressor in myeloid neoplasms, but our study found that inhibiting its activity rather than enhancing it could be a promising therapeutic strategy for AMLs driven by fusion proteins," said James Mulloy PhD, a researcher in the Division of Experimental Hematology and Cancer Biology at Cincinnati Children's and lead investigator.

AML develops and progresses rapidly, requiring prompt treatment with chemotherapy, radiation or bone marrow transplant. These treatments can be risky or only partially effective depending on the patient as well as the variation and progression of disease. Mulloy and colleagues are searching for targeted molecular approaches that could be more effective and carry fewer side effects.

The research team developed a mouse model of AML that is driven by fusion proteins and a mixed-lineage leukemic gene called MLL-AF9. When researchers genetically inhibited RUNX1 and an associated protein called core-binding factor subunit beta (Cbfb) in these mice, it stopped the development of leukemia cells.

While findings based on mouse models do not always translate to human disease, the findings demonstrate that RUNX1 merits further research as a potential therapeutic target for AML. MEH

First-reported emergency pediatric surgery of its kind: 5-year-old girl has massive tumor removed from abdomen and heart

Dr Emile Bacha is the Chief of the Division of Cardiac, Thoracic & Vascular Surgery at NewYork-Presbyterian/Columbia University Medical Center and Director, Congenital and Pediatric Cardiac Surgery at NewYork-Presbyterian/Morgan Stanley Children's Hospital. Dr. Bacha also serves as the Calvin F. Barber Professor of Surgery at the Columbia University College of Physicians and Surgeons.

Dr. Tomoaki Kato, surgical director of liver and intestinal transplantation at NewYork-Presbyterian Hospital/Columbia University Medical Center and chief of Abdominal Organ Transplantation and professor of surgery at Columbia University College of Physicians and Surgeons.

Last year, a 5-year-old New York girl underwent an emergency operation involving the removal and partial-re-implantation of her liver and her right kidney along with open heart surgery to resect an otherwise inoperable tumor. The 10-hour operation, the first reported emergency pediatric surgery of its kind, was led by Dr. Tomoaki Kato and Dr. Emile Bacha at NewYork-Presbyterian/Morgan Stanley Children's Hospital. The procedure to remove an extensive cancerous pediatric tumor included several medical teams specializing in abdominal, cardiothoracic, pediatric surgery and anesthesia. The tumor, a neuroblastoma, was shaped like an uneven set of barbells connected by a thick shaft. Tethered to the top of the right kidney, the tumor had worked its way into the liver and ballooned into much of the right atrium of the heart by muscling through a large connecting vein (the largest vein in the body), the inferior vena cava (IVC). "At the time of surgery, the IVC extending from the liver to the heart was completely blocked, creating a backup of blood from the legs and abdominal organs below the diaphragm. The tumor was also inside the heart, pressing against another major vein and partially blocking blood flow from the lungs and the upper body," says Dr. Kato, surgical director of liver and intestinal transplantation at NewYork-Presbyterian Hospital/Columbia University Medical Center and chief of Abdominal Organ Transplantation and professor of surgery at Columbia University College of Physicians and Surgeons.

As a first step, Dr. Kato and his team opened the abdominal cavity to mobilize the kidney and parts of the tumor and prepare abdominal blood flow to the bypass machine. Next, Dr. Bacha's team opened the chest and put the patient on cardiopulmonary bypass. This set the stage for another procedure, deep hypothermic circulatory arrest (DHPA), which cools the body to 18 degrees centigrade to safely stop the patient's blood flow.

As the cardiothoracic team waited for the patient's body to cool, the abdominal team isolated the tumor. When the patient's body reached the optimum temperature, Dr. Bacha's team opened the heart and pulled the top of the tumor from the right atrium. Simultaneously, the liver and the remainder of the tumor were taken out of the abdomen. The liver was repaired and re-implanted while the patient remained on bypass. The patient was then re-warmed and blood circulation was restarted. After blood flow to the liver was re-established, the patient was taken off bypass.

Although the patient's initial symptoms appeared to be relatively mild, seemingly overnight they had gotten much worse. By the time she was rushed to NewYork-Presbyterian/Morgan Stanley Children's Hospital, all of her symptoms pointed to a complete blockage of blood flow from the liver, notes Dr. Kato. "Without immediate intervention, it's unlikely she would have lived another 24 to 48 hours."

The cardiothoracic team's window to resect the tumor and repair the IVC was just 30 minutes, to guard against irreparable damage during the cooling process. What's more, both teams had to work in lockstep, timing their actions seamlessly. "Like a delicately choreographed dance, we had to work in synchrony, sometimes together, sometimes apart," says Dr. Bacha, chief of the division of Cardiothoracic Surgery, director of Congenital and Pediatric Cardiac Surgery at NewYork-Presbyterian/Morgan Stanley Children's Hospital and the Calvin F. Barber professor of surgery at Columbia University College of Physicians and Surgeons.

While no longer in immediate danger, the patient's prognosis will depend on how she responds to a rigorous treatment regimen involving chemotherapy, a bone marrow transplant, radiation, and finally, immunotherapy. "At this point, we are guardedly optimistic about her long-term prospects," says Dr. Darrell Yamashiro, pediatric oncologist at NewYork-Presbyterian/Morgan Stanley Children's Hospital and associate professor of pediatrics, pathology and cell biology at the Columbia University College of Physicians and Surgeons.

- For more information, visit: *www.nyp.org*

In the Region

Recently, New York-Presbyterian Hospital/Columbia University Medical Center (NYP/CU) signed an agreement with American Fetal & Children's Heart Center in Dubai Healthcare City in the UAE to collaborate and improve access to cardiac services for children in UAE, educate and train physicians, and jointly conduct research.

In addition, NewYork-Presbyterian Global Services (NYP) and Al Murjan Medical Company Limited have signed a cooperation agreement to enable NYP to establish a presence in the Kingdom of Saudi Arabia. The agreement will facilitate access to the expertise of NYP and its two primary medical school affiliates, Columbia University College of Physicians & Surgeons and Weill Cornell Medical College, to support the advancement of health care in Saudi Arabia. The office will open in early 2014.

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During Arab Health 2014 Philips will be hosting a variety of mini-seminars at its customer education village. The program will cover topics of interest to radiologists, cardiologists, critical care staff, administration, and all specialties relating to women's health and more. Come visit us, take part in one of the presentations and discuss with us how we can design a program just for you.

Dubai Healthcare City and Philips Healthcare work together to enhance professional healthcare education

Royal Philips and Dubai Healthcare City (DHCC) signed a memorandum of understanding (MoU) in May 2013 to conduct comprehensive medical education courses and continuous professional development programs in the UAE. The partnership will further enhance the capabilities of the healthcare workforce in line with the UAE's strategy for 2011-2013 to provide world-class healthcare and shows the continued commitment of Philips to the country, its citizens and residents.

The first 4 courses have already been delivered at the Mohammed Bin Rashid Academic Medical Center in DHCC – digital breast imaging, OR and Cathlab related L3D TEE ultrasound technique, MR Cardiac as well as 3D cardiovascular ultrasound.

Attendees commented that "speakers were very knowledgeable, courses are very informative, and it's a comfortable environment within which to ask questions and share experiences"

Respiratory weaning from mechanical ventilation: Leading the way for independent breathing

Professor Michael Polkey, Consultant Physician at Royal Brompton Hospital, discusses the pitfalls of mechanical ventilation and why a respiratory weaning service may be needed.

Mechanical ventilation is the process of connecting a patient to a machine that is able to do the patient's breathing for them. Since the tube is inserted through the upper airway, the patient has to be sedated with drugs. Once the patient is past the acute crisis, or their surgery is over, the doctors will try to get the patient to breathe for themselves.

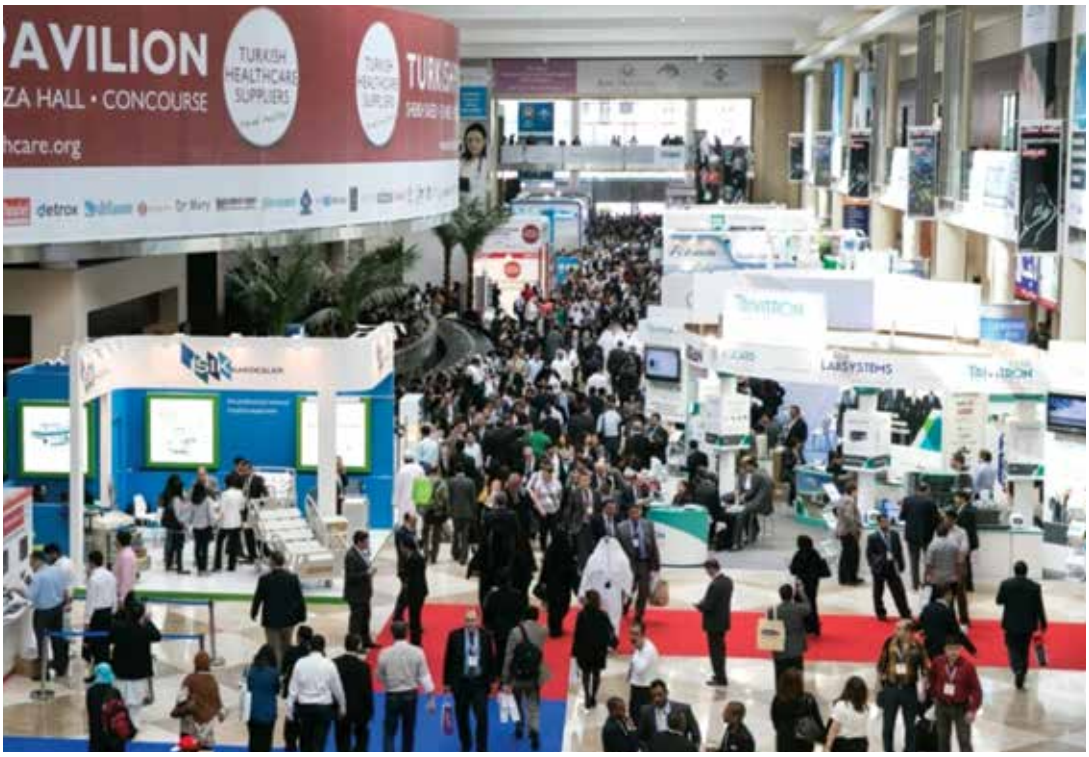
In most cases this process works without problems, but with a few patients it is impossible to remove the endotracheal tube at the first attempt. The reason for this is usually due to underlying medical conditions such as lung disease, heart disease, muscle weakness or retention of sputum in the airway, all of which impede independent breathing.

In the event that removal of the endotracheal tube is unsuccessful, then the patient will require 'weaning' from mechanical ventilation if they are to resume a normal life – or indeed to leave the ICU.

At Royal Brompton Hospital, we provide a consultant-led multidisciplinary approach to ensure that the patient has the best chance of weaning from mechanical ventilation. A key technique with which we have a lot of experience is the use of non-invasive ventilation to allow the patient to 'bridge' from tracheostomy ventilation. With this approach the support of the ventilator is given by a tightly fitting face mask from a 'low-tech' ventilator, suitable for use on the general ward or even at home. Once we are happy that the patient can breathe easily with this device, the tracheostomy is withdrawn.

Royal Brompton Hospital is the UK national centre for heart and lung disease and therefore receives referrals from surrounding intensive care units that find their patients difficult to wean. We also welcome referrals from overseas and already have established links with intensive care units across the Middle East.

- Should you have any questions about the respiratory weaning service at Royal Brompton Hospital, or to refer a patient, please email: *privatepatients@rbht.nhs.uk*



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Urgent need for effective surveillance and control of emerging infectious diseases in UAE

The GCC countries receive around two million working expatriates annually and 25% of these expatriates suffer from health issues, specifically infectious diseases. The most prevalent infectious diseases among expatriate workers are influenza, chicken pox, hepatitis, TB, malaria, sexually transmitted diseases, food borne disease, fecal-oral transmission diseases, and others. Communicable diseases still remain a concern to the UAE authorities, despite the fact that the incidence of many communicable diseases has declined sharply in recent years, emphasising the urgent need for effective surveillance and control in the region.

Dr Wasif Muhammad Alam, Director, Public Health & Safety, Dubai Health Authority (DHA), and Dr Rasha Salama, Senior Specialist, Public Health, Dubai Health Authority (DHA) will be discussing the current climate of infectious diseases in the UAE and GCC at the new Emerging Diseases of Public Health: Strategies and Interventions Conference at the Arab Health Exhibition & Congress from 27-28 January 2014 at the Dubai International Convention & Exhibition Centre.

Standards of healthcare are generally high in the Emirate of Dubai, reflecting high levels of public health over the last decades. However, communicable diseases still stand as a concern to the Emirate and plans are still on-going to control and eradicate such diseases.

"The increase in prevalence of many infectious diseases together with the on-going evolution of viral and microbial variants, and selection for drug resistance, suggests that infections will continue to emerge, and probably increase," says Dr Salama. "This emphasises the urgent need for effective surveillance and control in the region. Early warning of emerging and re-emerging infections depends on our ability to identify unusual patterns and occurrences as early as possible. Information exchange and collaboration with GCC countries is, therefore, essential."

According to Dr Alam: "The spread of communicable disease among expatriate workers can be fatal and the consequences are wide ranging. Factors that contribute to the spread of infectious diseases among expatriate workers, specifically migrant construction workers, include poor living conditions in many migrant worker camps as well as lack of awareness among employers and employees of the health impact of these diseases."

The GCC countries have been successfully implementing labour expatriate medical testing programmes in worker's home countries in the hope that the spread of these critical infectious diseases could be minimized. These expat workers get tested again once they enter the country and screened again for the working visa renewal.

"Despite the extensive screening efforts to tackle the problem of infectious disease transmission among expatriate employees, a key factor remains health awareness and health promotion which plays a vital role in educating employers and employees about the risks of contracting and spreading these diseases, especially for the diseases that are not currently screened in the region, such as chicken pox, hand to mouth diseases, food and water borne diseases that immigrant workers may carry," adds Dr Alam. MEH

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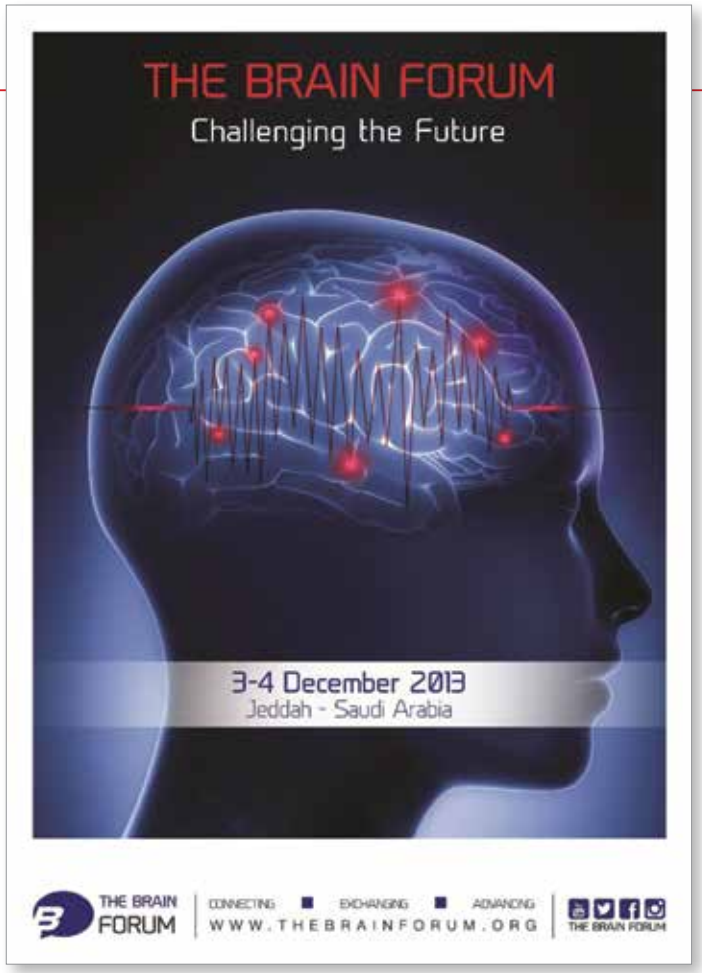
The Brain Forum introduces three new technologies in the Middle East



The Kingdom of Saudi Arabia hosted "The Brain Forum", a first-of-its-kind symposium in the Middle East. Some of the world's top neurologists and pioneers in the field of 'brain research' and personalized healthcare came spoke at the two-day conference on December 3 and 4, 2013.

"The Brain Forum" organized by W Science in collaboration with King Abdulaziz University, (KAU), King Abdullah University of Science and Technology (KAUST) in Saudi Arabia, the Saudi Society of Neurology and NeuroPro AG Switzerland, focused on "Challenging the Future." Renowned scientists from around the world presented their latest discoveries and open discussions were held on the future of brain research and related healthcare challenges. New tools, technologies as well as other personalized healthcare innovations to improve diagnoses, management and treatment of brain disorders were shown.

The W Science initiative was launched by Dr. Walid Juffali to support outstanding scientific projects and facilitate collaborations among leading scientists working at the interfaces of different scientific disciplines to address unmet medical needs and improve the quality of personalized care. Commenting on the event, Dr. Walid Juffali stated: "This event convenes some of neuroscience's greatest minds under one roof. It creates the opportunity for intellectual dialogue and insights that can invigorate efforts to combat some of the world's most pressing health-related issues referring to neurological illnesses.

With over one billion people affected by some type of neurological disorder worldwide, The Brain Forum was a highly anticipated event; the two-day forum saw discussion on topics ranging from the progress of brain research to the latest advances, challenges and opportunities in neuroscience and personalized medicine. Building upon these initiatives, The Brain Forum not only connected leaders, but invited other entrepreneurial leaders to learn from one another and more importantly, inspire one another to achieve much more.

Among them were three exciting new innovations of great interest. An EEG ambulatory headset, the NeuroTrail was presented. NeuroTrail is a flexible, ergonomically-designed, wireless headset for use in the real-time capture of EEG and ECG signals as well as other biometric data. Designed to adapt to individual head shapes, the NeuroTrail headset is comfortable and intended for every day, long-term use.

The NeuroTrail headset, undergoing clinical validation, features 1 to 8 channels of EEG captured with state of the art non-invasive electrodes. Recorded EEG / ECG / other data is transmitted wirelessly in real-time using Bluetooth or Bluetooth-LE and can be used for a wide range of clinical (e.g. epilepsy prediction) and non-clinical (e.g. gaming) applications. In addition, an EEG Virtual Mobile Laboratory made its debut at The Brain Forum this year. VML pro EEG, an EEG Virtual Mobile Laboratory Virtual Mobile EEG data management and analysis laboratory represents a convenient, one-stop solution for neural signal storage and analysis on the go. This solution will provide researchers and health professionals with the ability to easily upload captured brain signal data for storage, analysis, visualization and communication via a cloud-based Saas model.

By leveraging the latest developments in cloud computing technology VMLpro-EEG is able to cut the time of traditional data analysis from hours to minutes at a fraction of the traditional computing costs. NeuroPro is revolutionizing the speed and effectiveness with which neural data is processed and the usability of brain signal analysis to facilitate neurology research, disease monitoring and physician-patient interactions. When it comes to epilepsy prediction, another exciting development was showcased – a user-friendly, ambulatory, wireless integrated solution for the capture and analysis of EEG and other biological data in a clinically-validated system for the prediction of epileptic seizures. A modular solution including the following components: Ambulatory wireless headset for the measurement of EEG and other signals e.g. ECG Clinically validated and patented algorithm for the real-time analysis and prediction of epileptic seizures. Easy-to-use software application for the analysis and prediction of epileptic seizures, providing seizure probability alerts to a mobile device.

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MEDICA – good international business contacts

Good international business contacts are becoming increasingly important for manufacturers of medical technology and medical products. Only those that are well-positioned at the international level are able to balance weaknesses in individual markets and profit in the long run from a market that, seen globally, is growing. That is the key message conveyed after four days of events (20-23 November 2013) at MEDICA 2013, the world's largest medical trade fair, and COMPAMED 2013 (20–22 November 2013), the leading trade fair for the supplier market for medical technology manufacturing.

More than half of the some 132,000 trade visitors came from abroad, arriving from more than 120 countries. From the 4,641 exhibitors representing 66 countries, visitors obtained information on the entire spectrum of new products for high-quality, efficient medical care – ranging from medical technology and electromedicine, laboratory technology, physiotherapy products and orthopaedic technology to health IT.

"We have observed a growing number of visitors in recent years particularly from those emerging countries that are especially promising for the medical technology industry, namely from among Asian countries, from India, Russia as well as South America and China," said Joachim Schäfer, managing director of the Messe Düsseldorf. This assessment is shared by Germany's leading industry associations: SPECTARIS, ZVEI and BVMed draw attention to the significance of exports in their current market forecasts on MEDICA 2013. According to these reports, international business accounts for 68% of the almost 23 billion euros in current annual revenues generated by medical technology in Germany.

"Not only is the export quota high. Foreign trade is almost the only factor driving growth.

"On the other hand, competition in the German market is tough, not least because of the many international players," Tobias Weiler, managing director of SPECTARIS, explained.

The German Medical Technology Association (BVMed) sees purchasing pools as the reason for increasing pressure on prices in Germany. Such concentration of purchasing power is a further market trend reflected at MEDICA.

"The number of entities maintaining hospitals is decreasing. Demand is thus becoming concentrated in increasingly larger medical care networks and hospital groups. Consequently, especially high-level decision-makers are attending MEDICA," noted Horst Giesen, director of MEDICA + COMPAMED with Messe Düsseldorf.

Revised programme

To accommodate, through both trade fair and conference events, the continually growing number of international visitors seen in recent years, the previous conference programme was completely revised for MEDICA 2013. The newly planned MEDICA Education Conference was well attended on every day of the event. The conference included courses providing advanced training on topics for general practitioners and practical training on devices, which afforded national and European CME certification, as well as high-level scientific workshops on focus topics, presented by highly prominent speakers.

As has been planned for some time, from 2014 on, the German Society for Internal Medicine (DGIM) will serve as a partner for organising professional aspects of the MEDICA Education Conference. With more than 22,000 members, the DGIM is one of the largest professional medical associations in Europe.

Other offerings at this year's event, aimed at an international audience, were the International Conference on Disaster and Military Medicine – DiMiMED, and the MEDICA Medicine + Sports Conference, addressing special concerns of sports medicine. As premiers at this year's event, both conferences were extremely well attended and succeeded in closely knitting a transfer of medical knowledge on the one hand with presentations, by MEDICA exhibitors, of related product innovations on the other. Such products include wearable applications for recording vital body data, "anti-gravity" treadmills that support gentle rehab training and, of particular interest for disaster and military medicine, mobile medical imaging systems as well as emergency equipment for on-site first aid.

COMPAMED

COMPAMED, the international trade fair for the supplier market for medical technology manufacturing, was held parallel to MEDICA. With 681 exhibitors from 37 countries, a new historical record was set for the event. The exhibitors presented to the some 17,000 visitors an abundance of technology and service solutions for use in the "MedTech" industry – everything from new materials, components, preliminary products, packaging and services to complex micro system and nanotechnology.

- The next MEDICA Düsseldorf will take place from 12-15 November 2014.

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A new platform for IVD dialogue

Moritz Hartmann, General Manager of Roche Diagnostics Middle East

Most medical professionals would agree that there is an increasingly linear correlation between IVD results and patient treatment decisions. Innovations in IVD (in vitro diagnostics) have a direct and often life-changing impact on patients and their healthcare outcomes. Inaugurated this year, 'Roche Days Middle East' is the latest contribution to increasing both the knowledge and professionalism of the Middle East's diagnostics field.

Held from November 11-13, 2013, in Dubai, Roche Days provided a platform for local and regional opinion leaders and experts from both public and private institutions to share their experiences in IVD.

Moritz Hartmann, General Manager of Roche Diagnostics Middle East (RDME) welcomed some of the regions key industry leaders and opinion formers at the opening ceremony on November 11.

Commenting on the delegates present, Hartmann said: "It's a unique gathering of industry experts that have come together to exchange their latest experiences and challenges in an industry that is not just blooming but exploding."

Building trust

The healthcare sector in the Middle East is growing exponentially both in terms of new facilities, new technologies and patient numbers. With such a rapidly evolving industry, sharing information can add enormous value – particularly in IVD, where IVD results are the basis for 60% of spending on healthcare systems. Trust is, of course, a major factor.

Hartmann stressed the necessity of developing trust in the region's diagnostics and in recognizing the region's experts. IVD's role in day-to-day patient care and treatment choices cannot be underestimated.

Hartmann said that IVD's role in determining treatment choices is growing. He stated that the key missions of Roche Days revolved around improving the quality of IVD results, helping the industry mature and delivering results that are "trusted, produced here and not always referred out [of the region]."

A much needed platform

The relaxed and active atmosphere at Roche Days provided many of the region's key experts with a positive environment for an easy exchange of experiences.

For Dr. Fayad Dandashi, Founding Manager of Futurelab in Saudi Arabia, Roche Days was a great way to bring clients closer together. He said: "I believe in having a close rapport with clients. Education and knowledge is really what the end consumer is missing and this is the gap now being filled by Roche Days."

The platform for discussion offered by Roche Days is what Dr. Baher Badwi, appreciated about the event. The lab director at Erfan Hospital said: "I think from what we've seen today [Roche Days] is very helpful. It's very much needed that customers talk to each other. It brings to the surface the questions that people want to ask. They get the experience of other people."

Dr. Amid Abdelnour, Chief Executive Office at Biolab, was also impressed with Roche's continuous development. He said: "I expect a lot of advancement and a lot of automation from Roche. I know reliability is already there, credibility is there so I don't have to wait for it."

Similarly, Dr. Laila Abdel Wareth, Chair of Pathology & Laboratory Medicine Department, Sheikh Khalifa Medical City said: "The best thing we found with Roche is the support. The diagnostics, technological, and logistics support were all there for us."

Learning to work with new technologies

RDME's Head of Marketing, Giannis Batakis, sees the aim of Roche Days as bringing the region's customers together, with the "ultimate goal that it becomes part of RDME's service culture to its customers".

Roche Days also provides an open opportunity to receive feedback directly according to the needs of the industry in the region, which allows RDME to become an even better partner.

"If there is a demand for us as the IVD partner, then we know it's going to be an important and challenging year for us to deliver on it as well," Hartmann said. MEH

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Professor Ismail Matalka, President of the Congress and Chairman of the Department of Pathology and Laboratories at the Jordan University of Science and Technology, speaks to delegates.

400 regional and international pathologists attend the 25th Congress of the Arab Division of the International Academy of Pathology in Amman

Jordan bids to host the 32nd Congress of the International Academy of Pathology

Jordan hosted the 25th Congress of the International Academy of Pathology - Arab Division, and the 5th Conference of the Jordanian Society of Pathologists, which was inaugurated by the Mayor of Amman, Akel Baltaji, in a ceremony held at the Royal Hotel, Amman.

Professor Ismail Matalka, President of the Congress and Chairman of the Department of Pathology and Laboratories at the Jordan University of Science and Technology, stated: "The congress was a great opportunity to review the latest findings on tumour and disease diagnoses. It will also lead to establishing channels for close and permanent cooperation between pathologists in the Arab world and their Arab counterparts abroad, in addition to other platforms of cooperation between Arab pathologists and their global counterparts in the areas of pathology and laboratory medicine diagnosis and research."

The congress was held with the participation of eminent scientists from the United States, United Kingdom, France, Spain and Germany, and a number of Arab scientists abroad, in addition to scientists and experts from Jordan, Morocco, Algeria, Tunisia, Libya, Iraq, Syria, Lebanon, Yemen, Egypt, Kuwait, Bahrain, United Arab Emirates and Oman. Four hundred delegates attended the event.

The congress included a rich scientific program consisting of timely topics in pathology and laboratory medicine. There was a special session on breast and uterine cervix tumours and diseases – and the use of indicators in their early detection and the prediction of their progress, as well as the latest uses of immunostaining that assist in early warning of tumours, and their treatment.

"Pathology and laboratory medicine are the cornerstone of medical work in general, because they contribute to a large degree in reaching an accurate diagnosis and accordingly to the most appropriate treatment. This Congress follows the steps of previous meetings in its commitment to continuous education in pathology and promoting the discipline to junior trainees and exposing them to the new trends of the field and the experts in them," stated Professor Ghazi Zaatari, Professor & Chairman of Department of Pathology & Laboratory Medicine at the American University of Beirut Medical Centre and the Secretary of the Arab Division.

Other topics covered by the international speakers included tumours of the liver, lung, blood, and lymph nodes. There were reviews of the latest classification schemes as per most recently adopted international standards in addition to recent updates by leading experts on all specialities of laboratory medicine (clinical pathology) clinical microbiology and infection control, immunology and serology, coagulation and haematology, stem cells and blood banking, and clinical chemistry.

Professor Matalka added: "This conference is a platform that allowed various participants to showcase the latest updates in this medical field, such as oncology and more. Roche was a strong contributor to the conference as Roche's latest technologies and methods were shown to reach the most accurate diagnostic results."

As the 25th Congress of the International Academy of Pathology - Arab Division was held in Jordan for the sixth time. Prof Matalka noted that it is a clear indicator of the scientific status that the kingdom enjoys in all specialisations. It also demonstrates Jordan's capabilities in providing excellent therapeutic services, not only on the local level but also the region.

He indicated that Jordan – on behalf of the Arab Division – submitted a bid to host the 32nd Congress of the International Academy of Pathology for 2018. Approximately 5,000 experts from around the world are expected to attend the event. MEH

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53,000 attend RSNA to learn about latest developments in radiology

By **Jay Franco**
Middle East Health Correspondent

The 99th Scientific Assembly and Annual Meeting of the Radiological Society of North America (RSNA) was held from 1-6 December 2013 in Chicago, USA. More than 53,000 people came to the event to attend some 5,000 scientific research presentations and education exhibits. RSNA offers the latest developments in radiology and related imaging technologies dealing with diagnosis, intervention and therapy.

Alongside the conferences, the exhibition had a lot of new products and technologies to offer. We have covered the best of the best modality wise as follows:

Ultrasound

- **Siemens:** HELX Evolution was introduced by Siemens as part of the Acuson S family. It offers a 21.5 inch LED backlit 1080p LCD monitor which ensures image quality, and has a more compact design to improve comfort, ergonomics and access.
- **Toshiba:** Aplio 500, by Toshiba, combines advanced visualization capabilities, workflow automation tools and ergonomics for more accurate diagnoses and improved departmental efficiency. It has two advanced features: a) Fly Thru (4D ultrasound that allows clinicians to 'fly through' interiors of fluid-filled ducts and vessels), and b) Smart Fusion (synchronizing CT or MR with live ultrasound to located hard-to-find lesions and aid in ultrasound-guided biopsies.
- **Philips:** EPIQ – the newest ultrasound system showcased by Philips for the first time, delivers excellent image resolution and details. It offers the world's first panoramic volume organ scan enabling clinicians to easily capture, visualise and quantify a full organ (e.g. liver or pancreas), a full uterus or a full fetus in a 3D panoramic volume.
- **Sonosite:** X-Porte, by Fujifilm Sonosite, demonstrated its high resolution ultrasound kiosk which was intended to increase access to ultrasound visualization for patients. It was designed to cure side-lobe imaging artifacts, through a brand new type of technology used in an ultrasound system: SonoSite's Extreme Definition Imaging (XDI). XDI is a new beam forming algorithm that significantly reduces the visual clutter from side-lobes that affect all ultrasound products regardless of system size. The resulting ultrasound image appears cleaner with optimal tissue differentiation.

■ **Zonare:** A high frequency ultrasound transducer, L20-5 was showcased by Zonare. This transducer has a 32 mm aperture and up to 5 cm penetration. It provides excellent imaging for pediatric, musculoskeletal, breast, testicle, interventional, vascular, contrast enhanced ultrasound (CEUS), advanced research and other applications. It is based on ZONE Sonography Technology (ZST), which is an innovate approach to echo data acquisition and image formation. Using a small number of large "zones", ZST acquires ultrasound data up to 10 times faster than conventional ultrasound and extracts more information on each transmit receive cycle.

Computed Tomography (CT)

■ **Toshiba:** Toshiba featured their most advanced CT system, Aquilion ONE VISION, which offers low-dose exams with the largest bore, widest coverage and thinnest slices, and can accommodate more patients including bariatric and patients with high heart rates. It is equipped with AIDR 3D, fast acquisition speeds and advance dose reduction technology which make CT imaging safer by reducing radiation dose.

■ **Medic Vision:** SafeCT Iterative Image Reconstruction by Medic Vision provides a cloud-based low-dose CT lung screening service which allows any radiology department to perform low-dose CT lung screening without purchasing and implementing iterative reconstruction technology. Lung images are forwarded to a remote cloud-based SafeCT system for processing.

■ **Philips:** The world's first spectral detector-based CT by Philips - IQon Spectral CT allows clinicians to use colour within CT images to identify the composition of what they see. They can add spectral resolution to image quality and can get the anatomical information they are used to with CT.

■ **Siemens:** Siemens' Somatom Perspective family of CT scanners demonstrated the capability of a new 16- and 32-slice configurations, with the option of upgrading to the established 64- and 128-slice configurations. The 16-slice Somatom Perspective ensures that pain-relieving analgesics are delivered to the correct location during surgery, and the 32-slice configuration is designed to provide more detailed imaging for bone fractures, inner ear examinations, and vascular applications. Both configurations of the Somatom Perspective feature the SAFIRE (Sinogram Affirmed Iterative Reconstruction) algorithm, which enables the user to reduce radiation dose by as much as 60% or improve image quality correspondingly.

Magnetic Resonance (MR)

■ **Philips:** Philips' Ingenia 1.5T and 3.0T set a new standard in image quality, clarity, scanning efficiency and scalability. The key benefits are to drive clinical performance (with digital clarity and speed to ensure more diagnostic info in shorter timeslots), to enhance patient experience and to ensure economic value.

■ **Siemens:** Magnetom Skyra 3T and Magnetom Area 1.5T offered by Siemens are designed to enable fast body MRI for all patients. Alongside these systems was their new StarVIBE MR pulse sequence to enable free breathing, contrast-enhanced liver imaging for patients who are unable to easily manage breath-holding. Also new was their TWIST-VIBE MR sequence designed to enable correct contrast imaging in dynamic liver MRI for all patients and lesions, allowing fast, robust liver imaging with full 4D coverage. The sequences StarVIBE and TWIST-VIBE will be available as the FREEZEit package.

■ **Toshiba:** Toshiba's Vantage Titan 3T came equipped with advanced multi-phase RF transmission technology that reduces troublesome dielectric shading artifacts. The system is able to produce whole-body images and is suitable for hospitals that require advanced MRI capabilities and abdominal imaging. It comes with a 71 cm aperture for bariatric patients, reduces claustrophobia, and ensures patient comfort with their patented Pianissimo technology that significantly reduces acoustic noise during scanning. The system also features an enhanced M-Power interface, which simplifies MR scans by automatically guiding clinicians to more accurate and efficient exams.

■ **Time Medical Systems:** The industry's first neonatal Neona MRI system was launched by Time Medical Systems, which includes a high-field superconducting magnet with a co-designed patient incubator. It is capable of monitoring and supporting critical neonatal patients during their MR imaging examinations followed by observations.

■ **Hologic:** Hologic's MultiView MR software offers advanced options to provide real-time 4D (3D + time) imaging processing, speed, flexibility and dedicated MRI algorithms for both breast and prostate diagnostic viewing. MultiView is a state-of-the-art imaging platform for MRI visualization and interventional guidance.

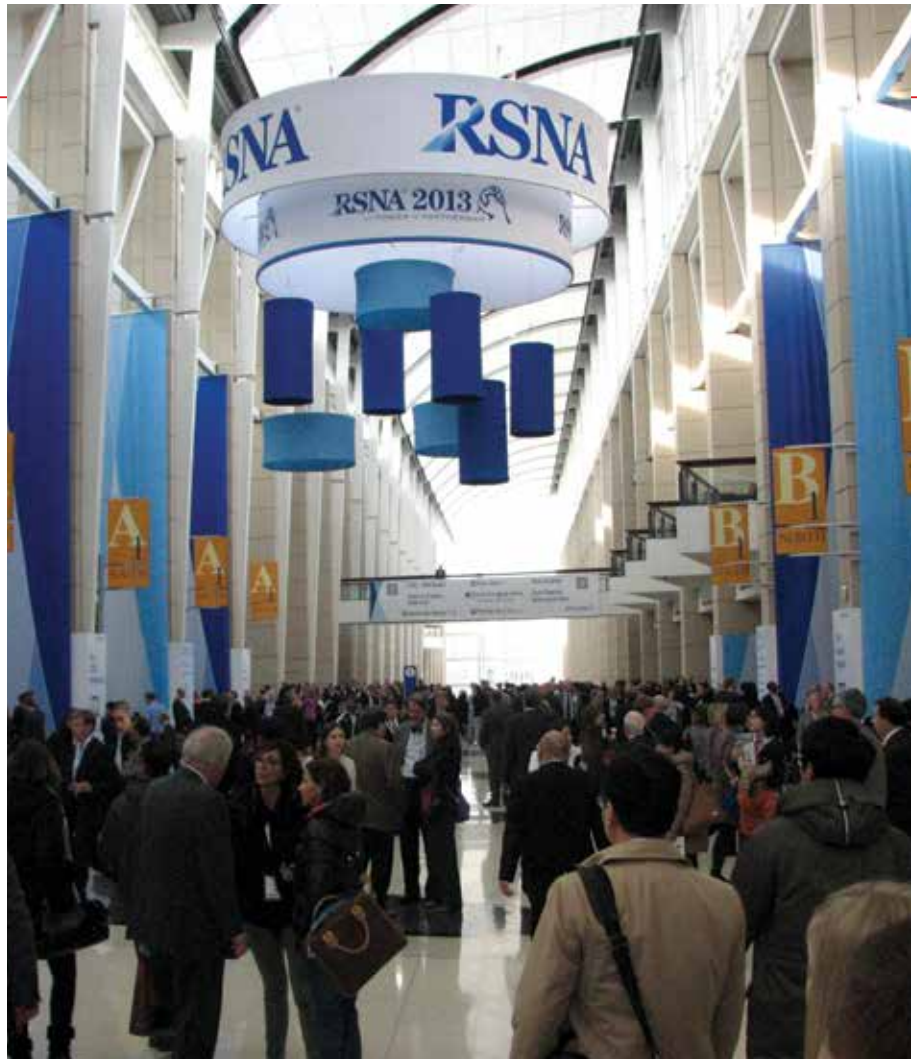
X-Ray

■ **Toshiba:** Toshiba's automated RADREX-i digital radiographic system can reduce overall procedure time, allowing radiologists to enhance workflow and increase patient throughput. The robust system is available with a wireless detector and includes features necessary for imaging a variety of patients, from pediatric to bariatric. The system features RexProtect dose savings technology; RexSpeed technology to automate workflow and; RexView with image preview to enhance patient care by allowing technologists to make point-of-care decisions.

■ **Agfa:** A new small-format, wireless flat DR panel detector, DX-D 35C was showcased by Agfa HealthCare. With its small 30x38 cm size, it is ideal for orthopaedic and other radiography imaging. It provides high signal-to-noise ratio for higher contrast and high diagnostic confidence, plus twice the dose quantum efficiency (DQE) of gadolinium-based solutions.

■ **Fujifilm:** Fujifilm Medical Systems announced their 510(k) clearance from the FDA of its gadolinium and cesium digital x-ray detectors for pediatric use. The smallest format 24x30 cm cesium iodide detector is specifically designed to offer high DQE performance for low dose x-ray exams such as for small patients and anatomy such as extremities, shoulders, c-spines and more.

■ **Nuance:** Nuance announced their faster and more accurate speech recognition PowerScribe 360 platform that enables a quality, data-driven approach to radiology reporting for radiology groups, hospitals and healthcare systems. This



platform allows radiologists to more easily navigate changing reimbursement models by driving efficiencies in the creation of actionable, structured reports that directly improve patient care. It is aimed at empowering the delivery of high-quality care, driving faster and more accurate report generation, simplifing communication of patients' critical test results and enhancing quality and performance with analytics.

PROTEC: Proslide 32 DR –Touch, developed by PROTEC, is a fully digital and mobile x-ray, ideal for emergency rooms, ICU departments as well as orthopaedic and part-radiologic clinics for x-ray exposures of immobile patients. It comes with a 22" multi touch wide screen monitor, which provides high performances, easy to use workflow and allows high quality images with optimized dose.

PACS

Carestream: Carestream demonstrated their works-in-progress (WIP) new generation of its VuePACS platform which is designed to create productivity-enhancing capabiities for radiologists and referring physicians, including embedding access to key image data using links within the report which merges images into the reporting workflow. It also includes an innovative teleradiology module that gives remote radiologists access to prior exams and automatically sends radiology reports to the requesting facility.

Paxeramed: Paxeramed displayed their third generation of PaxeraUltima 3.0 – a versatile browser based multi-modality medical viewer that delivers a consolidated work list, zero-footprint and vendor-neutral access (VNA) to studies throughout the enterprise with a full spectrum of diagnostics and reporting tools – all from a single login. It is capable of sharing large data sets to multiple locations, and features a patient history timeline enabling access to a patient's entire clinical history.

Thinking Systems: Thinking Systems offered their cloud-based solution in PACS for Radiology and Molecular Imaging. It supports all radiology modalities, including CT, MR, CR/DR, ultrasound, fluoro, etc; and includes comprehensive PET-CT/SPECT-CT fusion functions including 2D/3D SUV, triangulation, size measurement, alpha bending, window/level, gamma, etc for molecular imaging. Both these solutions are based on Windows Server 2008 R2 64-bit platform and provide real-time performance matches or even surpasses that of local applications with local data. They support all common client platforms such as Windows (32-bit and 64-bit) – XP, Vista, 7 & 8; Apple MacOS, iOS; Android 2.0 and newer, and can support multiple monitors on client computers.

Displays

Sony: New developments in 4K and 3D imaging technologies were highlighted by Sony Electronics. The LMD-2451MT 24-inch display was part of their 3D medical display line, joined by a 32-inch model. The 24-inch version is featured for its use as a secondary monitor for 3D review of interventional procedures by GE Healthcare, taking signals from a GE Vivid E9 cardiac ultrasound scanner. Also showcased was a new 65-inch Pro BRAVIA 4K professional display to show 4K footage recently captured at the Anatomy Lab of the Duke School of Medicine. The Sony camera used was the F55, the same 4K camera model now in use on movie, TV and live event locations worldwide. The footage demonstrates how the clarity, resolution and detail of 4K images hold great potential for increased visualization. In addition to producing beautiful images, the display's Multi-View feature lets medical professionals see a "quad-split" view of four full HD signals on one display, helping them view different angles simultaneously of the same procedure.

Ampronix: Hybridpixx, a standalone unit newly introduced by Ampronix, replaces 6 separate monitors, creates a 56" medical display that enables one to orient six video sources simultaneously into the 50"x25" video grid based on viewing preferences and for multiple users. It is important to note that the unit contains all of the hardware needed to perform the feat, and is designed to be a quick installation. Once it is mounted to the boom and cables are connected, it is totally operational. It comes with 5 presets and 5 customizable video configurations with a 10.4" touch screen controller and intuitive software.

The next meeting will mark the centenary year of the RSNA, and will take place from 30 November – 5 December 2014. For more information, visit *www.rsna.org* MEH

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Second Annual Emirates Oncology Conference gives boost to cancer care in the GCC

The second edition of the industry-leading Emirates Oncology Conference was held was held at Emirates Palace, Abu Dhabi in November last year and received a record number of delegates from the healthcare profession across the Middle East.

The delegates attended more than 100 sessions over the course of three days, led by almost 90 expert speakers from 13 countries around the world – including the Middle East, Europe, North America, Asia and Australasia. The speakers were hand-picked as leaders in their respective fields of cancer treatment and care, each able to give global and regional perspectives on industry-shaping insights and innovations.

The Second Emirates Oncology Conference: 'Setting New Standards in Cancer Care' was hosted by the regional cancer referral centre, Tawam Hospital, in affiliation with Johns Hopkins Medicine, and the Abu Dhabi Health Services Co. (SEHA). Sessions included paediatric oncology, clinical trials and cancer registry, and gynaecological oncology, as well as breast cancer; palliative care; gastrointestinal, urology and pulmonary oncology; and haematology.

Closing the conference, Dr Mohammed Jaloudi, Chair, Emirates Oncology Conference, said: "The feedback we have had from delegates and visitors over the course of these last three days has been simply phenomenal. The fact that we have been able to bring 1,000 healthcare professionals together to share their own experiences of treating cancer and working with cancer patients and their families, to learn from leaders in their respective fields of oncology, to see and hear the latest findings across so counties and so many different forms of cancer – which impact so many families across the Emirate and across the region – is an incredible achievement. I'm proud that the Tawam Hospital team has been part of it, and I'm grateful to SEHA for their support, and to all of our speakers who made this event such a resounding success." MEH

International EECP Society officially launched at the Third International EECP Symposium

On Saturday, October 12, 2013, at the 3rdInternational EECP Symposium held during the 24th Great Wall International Congress of Cardiology and Asian Pacific Heart Congress 2013 in Beijing, China the International EECP Society (IEECPS) was officially established.

IEECPS is an independent not-for-profit association of physicians, researchers and other professionals involved in the study, research, application and provision of Enhanced External Counterpulsation (EECP) Therapy. The objective of the Society is to raise awareness about EECP therapy as an effective treatment modality for heart disease and to explore applications of EECP in other ischemic diseases.

Through publishing newsletters and expert consensus and organizing events such as conferences and symposiums, the Society will be actively engaged in disseminating the latest research results, educating clinicians and other healthcare professionals, and promoting patient awareness to increase global acceptance of EECP therapy in its endeavor to improve the quality of life for all.

Dr. William E. Lawson, Professor of Medicine and Chief of the Division of Cardiology at Stony Brook University, New York, USA was selected as the Society's first president. Dr. Guifu Wu, President and Director of the Fourth People's Hospital of Shenzhen, China was elected as Vice President of the Society. Many leading international experts in cardiology as well as in EECP therapy participated in the Society's preparation meeting during the Symposium and joined the Society, signaling great support for EECP therapy.

"With the recent development of scientific evidence supporting EECP therapy as an effective treatment for ischemic heart disease, we realized the need to bring together expertise in the field to discuss best practices, promote research, increase acceptance and drive utilization of the therapy globally. The International EECP Society provides just such a platform that will effectively execute these challenging tasks," stated Dr. Lawson. "I am extremely encouraged by the enthusiastic endorsement we have received right at the launch of the Society, and look forward to working with colleagues all over the world towards of our common goal of benefiting more people with EECP therapy."

The 3rd International EECP Symposium was organized by a group of cardiovascular experts including Dr. Hu Dayi, President of the Great Wall International Congress of Cardiology, Dr. C. Richard Conti, President Emeritus of the American College of Cardiology, Dr. William E. Lawson, Dr. GuiFu Wu and Dr. John CK Hui, an internationally recognized EECP expert. The Symposium was sponsored by Vasomedical Inc., Westbury, New York, USA, the world leader in Enhanced External Counterpulsation technology, and Chongqing PSK-Health SciTech Development Co. Ltd., Chongqing, China, the leading manufacturer in external counterpulsation systems in China.

on the WEB International EECP Society
www.ieecps.org

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The challenge of transporting medicines

By **Leslie Morgan**, OBE
Managing Director Durbin PLC.
Leslie Morgan is a member of the Royal Pharmaceutical Society of Great Britain

It's always been a challenge to transport medicines from one part of the world to another. They are sometimes heavy and/or fragile and in most cases, time is of the essence. The challenge becomes even greater when the product needs to be stored within a specified temperature range.

The responsibility is huge – a single loose link in the supply of temperature-controlled products could mean that costly and essential pharmaceuticals are left in an unusable or even potentially dangerous state. Cortisone cream, for example, can separate and become ineffective once it is exposed to temperatures above 30°C. Other drugs such as insulin might lose its effectiveness once it is exposed to freezing temperatures.

In March this year, the EU Good Distribution Practices were published. The guidelines have been updated to reflect the more complex logistic supply chains of current times, and to ensure that control over the quality and integrity of the distribution chain is maintained all the way from manufacturer to patient.

The new GDP guidelines enforce a much larger responsibility on the distributor for the quality of the product that reaches the patient. The most significant of these is a requirement for all 'ambient' products (those that require storage from 15°C – 25°C) to be packaged in temperature-controlled boxes.

I am left wondering at the impact of such a move. Although distributors such as ourselves will always meet regulations and guidelines set by the authorities, how will this work in the common workplace? Will our customers be prepared to pay for expensive temperature-regulated packaging?

It's not unusual for Durbin to source a product in England (where temperatures are variable depending on the season) and transport it to the Middle East where temperatures regularly soar above 40°C.

The transportation and distribution of pharmaceuticals requires special consideration in warm climates such as the Middle East. It is of paramount importance that the perfect temperature of the shipment is maintained and managed throughout transit.

I have seen the reliance on technology in the pharmaceutical supply chain gradually rise in the last decade. In the last few years, sensor-based systems have become increasingly commonplace to alert at the slightest change of temperature, or even lighting fluctuations. Temperature data monitors – electronic devices which can be set to take readings at regular intervals throughout transit – can also be placed in the box.

In the past, these devices were primarily used for fridge line products and not for those requiring storage from 15°C – 25°C. However, with the new EU GDP guidelines in place, customers will now have to specify whether they want thermally regulated packaging or temperature monitors in with their 'ambient' pharmaceuticals.

Regulations surrounding the transportation of medicines in the Middle East have become tighter in the last few years and they are only likely to become more rigorous in the future. The updated guidance from the US Pharmacopeia and the Parenteral Drug Association have urged pharmaceutical companies to demand more quality assurance measures from their logistics providers. I am certain that the new EU GDP guidelines will also have a similar influence.

Some countries in the region have already taken steps to boost their cold chain security. Saudi Arabia, for example, has introduced an entry requirement making it mandatory for individual shipments of pharmaceuticals requiring temperature controlled storage to be documented on arrival.

Training of staff in high risk areas also needs to be intensified. Ground handling at airports and customs/authorities inspections – anyone that comes into contact with the shipment needs to be trained on how to handle the product and to ensure that it does not fall out of the remit of its storage conditions.

The increasing formalisation of qualifications, contracts and processes that the new EU GDP guidelines outline is compelling. They demand a much higher level of quality in terms of service and supply, and set a basic benchmark that will encourage all providers to maintain high levels of service and further help to ensure our pharmaceuticals are as safe and effective as possible. MEH

Durbin PLC is a British company based in South Harrow, London. Established in 1963, the company specialises in supplying quality assured pharmaceuticals, medical equipment and consumable supplies to healthcare professionals and aid agencies in over 180 countries. As well as reacting rapidly to emergency situations, Durbin PLC responds to healthcare supply needs from local project level to national scale programmes.
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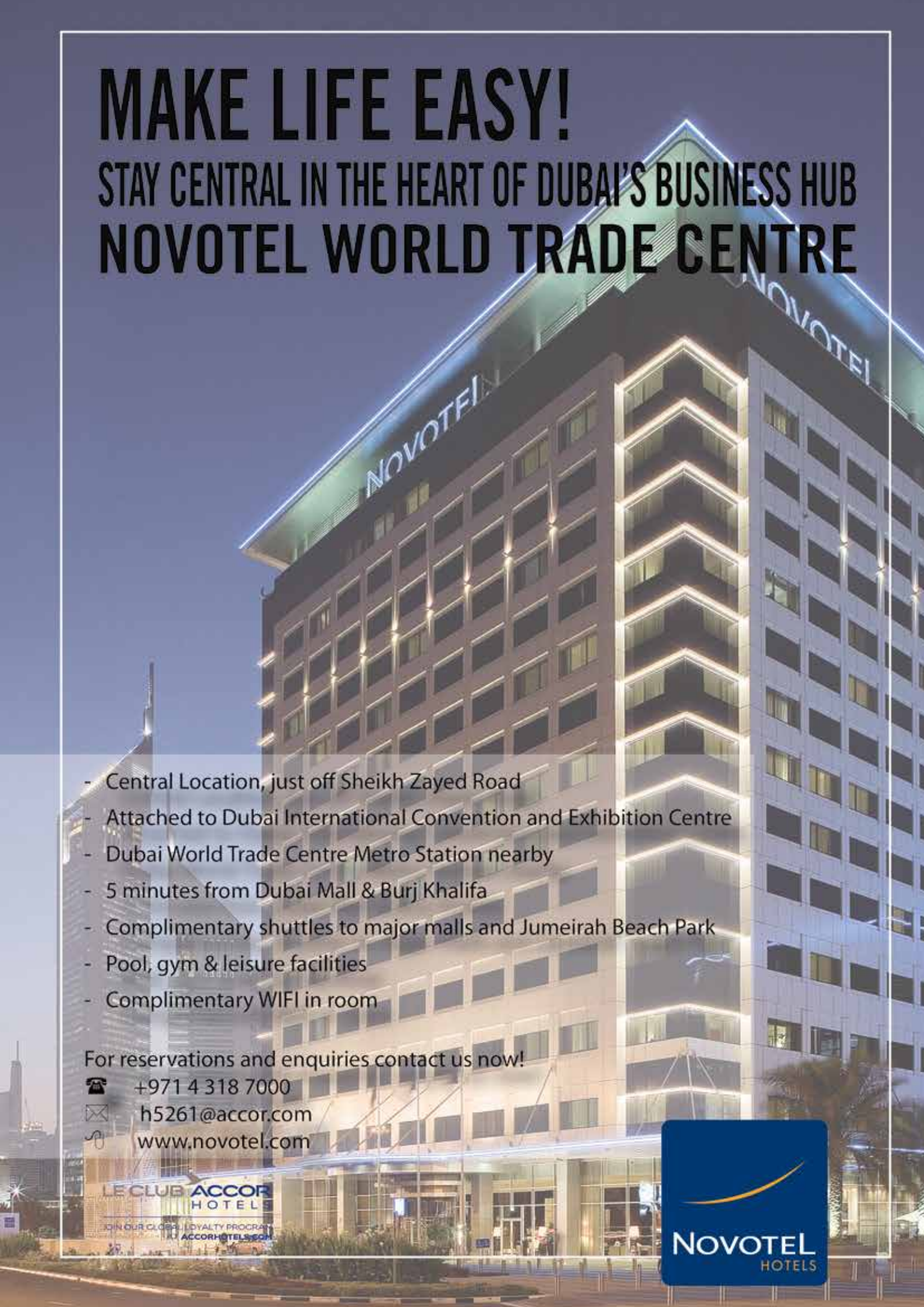
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Study expands concerns about anaesthesia's impact on the brain

As paediatric specialists become increasingly aware that surgical anaesthesia may have lasting effects on the developing brains of young children, new research suggests the threat may also apply to adult brains.

Researchers from Cincinnati Children's Hospital Medical Center report in the *Annals of Neurology* (June 5, 2013) that testing in laboratory mice shows anaesthesia's neurotoxic effects depend on the age of brain neurons – not the age of the animal undergoing anaesthesia, as once thought.

Although more research is needed to confirm the study's relevance to humans, the study suggests possible health implications for millions of children and adults who undergo surgical anaesthesia annually, according to Andreas Loepke, MD, PhD, a physician and researcher in the Department of Anesthesiology.

"We demonstrate that anaesthesia-induced cell death in neurons is not limited to the immature brain, as previously believed," said Loepke. "Instead, vulnerability seems to target neurons of a certain age and maturational stage. This finding brings us a step closer to understanding the phenomenon's underlying mechanism"

New neurons are generated abundantly in most regions of the very young brain, explaining why previous research has focused on that developmental stage. In a mature brain, neuron formation slows considerably, but extends into later life in dentate gyrus and olfactory bulb.

The dentate gyrus, which helps control learning and memory, is the region Loepke and his research colleagues paid particular attention to in their study. Also collaborating were researchers from the University of Cincinnati College of Medicine and the Children's Hospital of Fudan University, Shanghai, China.

Researchers exposed newborn, juvenile and young adult mice to a widely used aesthetic called isoflurane in doses approximating those used in surgical practice. Newborn mice exhibited widespread neuronal loss in forebrain structures – confirming previous research – with no significant impact on the dentate gyrus. However, the effect in juvenile mice was reversed, with minimal neuronal impact in the forebrain regions and significant cell death in the dentate gyrus.

The team then performed extensive studies to discover that age and maturational stage of the affected neurons were the defining characteristics for vulnerability to anaesthesia-induced neuronal cell death. The researchers observed similar results in young adult mice as well.

Research over the past 10 years has made it increasingly clear that commonly used anaesthetics increase brain cell death in developing animals, raising concerns from the Food and Drug Administration, clinicians, neuroscientists and the public. As well, several follow-up studies in children and adults who have undergone surgical anaesthesia show a link to learning and memory impairment.

Cautioning against immediate application of the current study's findings to children and adults undergoing anaesthesia, Loepke said his research team is trying to learn enough about anaesthesia's impact on brain chemistry to develop protective therapeutic strategies, in case they are needed. To this end, their next step is to identify specific molecular processes triggered by anaesthesia that lead to brain cell death.

"Surgery is often vital to save lives or maintain quality of life and usually cannot be performed without general anaesthesia," Loepke said. "Physicians should carefully discuss with patients, parents and caretakers the risks and benefits of procedures requiring anaesthetics, as well as the known risks of not treating certain conditions."

Physicians should carefully discuss with patients, parents and caretakers the risks and benefits of procedures requiring anaesthetics, as well as the known risks of not treating certain conditions.

Loepke is also collaborating with researchers from the Pediatric Neuroimaging Research Consortium at Cincinnati Children's Hospital Medical Center to examine anaesthesia's impact on children's brain using non-invasive magnetic resonance imaging (MRI) technology. MEH

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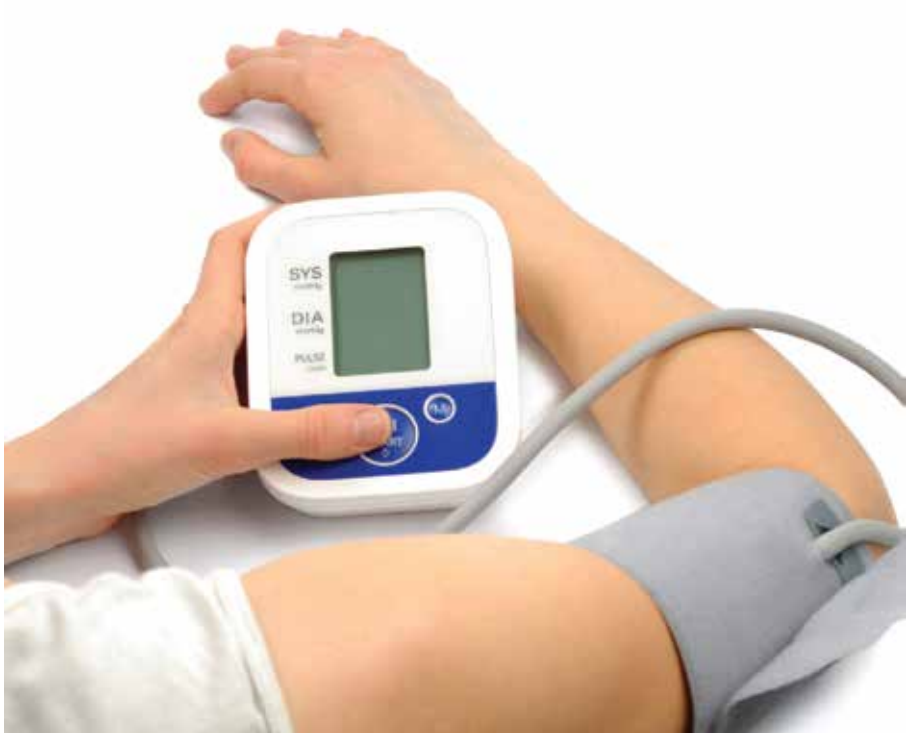
New hypertension guidelines offer practical, clinical information for doctors and patients

High blood pressure affects approximately one in three adults in the Americas, Europe, some Asian countries and Australia, and one billion people worldwide. Because of this epidemic, The American Society of Hypertension, Inc. (ASH) and the International Society of Hypertension (ISH) are pleased to announce the creation of first-of-their-kind guidelines for the diagnosis and treatment of Hypertension: "Clinical Practice Guidelines for the Management of Hypertension in the Community." These are the first guidelines to be usable for medical practitioners in any socioeconomic environment around the globe, from those countries with state-of-the-art equipment to those that lack basic resources. And, most importantly, they are designed with guidance that is easy to implement for doctors and healthcare professionals in even the most impoverished areas.



The guidelines were first published on December 17 by the *Journal of Clinical Hypertension* in the U.S. and the Journal of Hypertension in Europe. They will also appear in medical journals across Latin America and have been endorsed by the Asian Pacific Society of Hypertension. The guidelines have already been translated to French, Spanish and Creole, and there are plans to continue translations for populations across the globe.

"These guidelines have been written to provide a straightforward approach to managing hypertension in the community. We are so proud to have created a set of guidelines that can help not only doctors but also patients understand their disease and the care they receive," says Dr. Michael A. Weber, Editor-in-Chief of the *Journal of Clinical Hypertension*, former ASH President and current ISH Council member.

"Within the International Society of Hypertension we wanted to create Guidelines for management of hypertension for practitioners, which would provide easy to follow recommendations that were evidence-based and could be carried out in countries that have healthcare systems with either limited or with abundant resources, and above all, that were simple and user-friendly, contributing thus to the control of this highly prevalent condition. Indeed, hypertension is the number one cause of burden of disease worldwide," says Dr. Ernesto L. Schiffrin, President of ISH.

Hypertension is the most common chronic condition dealt with by primary care physicians and other healthcare practitioners. There is also a close relationship between blood pressure levels and the risk of cardiovascular events, strokes and kidney disease.

"With the development and dissemination of treatment guidelines that are designed to educate medical practitioners, doctors in training and other health care providers, ASH is furthering its commitment to our mission through initiatives that aim to improve the clinical management of hypertension and its complications," says Dr. William B. White, professor of medicine and current President of ASH.

The guidelines' 25 authors include top hypertension specialists and pharmacists from around the world, including past and present officers of the American Society of Hypertension and the International Society of Hypertension.

on the WEB Clinical Practice Guidelines for the Management of Hypertension in the Community
www.ash-us.org/documents/ASH_ISH-Guidelines_2013.pdf

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Atrial fibrillation is a serious global health problem – WHO

Atrial fibrillation, long considered the most common condition leading to an irregular heartbeat, is a growing and serious global health problem, according to the first study ever to estimate the condition's worldwide prevalence, death rates and societal costs.

The World Health Organization data analysis, led by Sumeet Chugh, MD, associate director of the Cedars-Sinai Heart Institute, shows that 33.5 million people worldwide – or .5% of the world's population – have the condition. Funded partly by the Bill & Melinda Gates Foundation and the Cedars-Sinai Heart Institute, the analysis was conducted with the assistance of the University of Washington's highly respected Institute for Health Metrics and Evaluation, which seeks to identify the world's major health problems so society can best allocate medical resources and funding.

Atrial fibrillation occurs when electrical impulses in the upper chambers of the heart, called the atria, become chaotic and cause an irregular heartbeat. The irregular heartbeat can result in heart palpitations along with a variety of symptoms such as fatigue. When the heart isn't pumping blood effectively, blood can stagnate and clot. If the clots break apart and travel to the brain, they can cause a stroke.

The study, believed to be the first to determine the number of people globally with atrial fibrillation, is published online in the peer reviewed medical journal *Circulation* and is scheduled to be published in the Feb. 25 print edition of the journal.

"Atrial fibrillation has a huge cost in every sense of the word," Chugh said. "It can lead to stroke, hospitalization, as well as lost productivity. Our findings indicate that atrial fibrillation is on the rise around the world and it's a huge public health burden."

During the analysis, Chugh and a team of researchers systematically analyzed data from selected population-based research studies, from among 1,784 published medical research studies on atrial fibrillation, to estimate global and regional prevalence, incidence and mortality related to this condition.

"Finding out the scope of the problem is step No. 1," Chugh said. "Our hope is that we can develop a sustainable global plan to manage atrial fibrillation and find new and effective ways of preventing this condition."

Among the study's findings:

- In 1990, an estimated 570 of 100,000 men had atrial fibrillation. In 2010, the prevalence rate for men was 596 of 100,000.
- For females, an estimated 360 of 100,000 women had atrial fibrillation in 1990. In 2010, that rose to 373 of 100,000.
- In 1990, the number of new cases of atrial fibrillation in men was estimated at 61 per 100,000 population. In 2010, the number of men with new cases of atrial fibrillation rose to 78 per 100,000.
- The number of new cases of atrial fibrillation in women was 43 per 100,000 population in 1990. In 2010, the number of new cases in women was 60 per 100,000.
- Although deaths linked to atrial fibrillation are rising around the world, more women with atrial fibrillation are dying in developing countries. In the U.S., deaths linked to atrial fibrillation now are comparable between the sexes.

> Atrial fibrillation has a huge cost in every sense of the word. It can lead to stroke, hospitalization, as well as lost productivity. Our findings indicate that atrial fibrillation is on the rise around the world and it's a huge public health burden.

"A lot more research is needed to fully understand this continuing worldwide increase," Chugh said. "Although the chance of developing atrial fibrillation does increase with age, these findings are not entirely explained by the aging world population. Several other factors have been suggested and need to be better evaluated, from obesity and hypertension to air pollution." MEH

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New iPad-based 'early warning' system used for hospital patient monitoring

Handwritten medical observation charts could become a thing of the past in hospitals with the development of a pioneering patient monitoring system developed in Oxford hospitals. An iPad-based early-warning system developed with EPSRC funding is one of the projects funded by the 'Safer Hospitals, Safer Wards' £260 million (about US$424 million) British NHS Technology Fund to improve patient safety. The £1.1 million funding will allow the team of biomedical engineers and clinicians from the University of Oxford and the Oxford University Hospitals (OUH) NHS Trust to roll out the system across all adult wards in the Trust's acute hospitals.

The new approach uses the latest computer tablet technology both to record and to evaluate patients' vital signs. It will help alert medical staff to patient deterioration on the wards more reliably.

The Research Councils UK Digital Economy Programme, which is led by the Engineering and Physical Sciences Research Council (EPSRC), funded the research underpinning this unique 'track-and-trigger' system; its translation onto the ward was supported by the Oxford Biomedical Research Centre (BRC), which brings together university academics with clinicians at the Oxford University Hospitals (OUH) NHS Trust.

Just as now, nurses will regularly take readings of a patient's vital signs such as heart rate and blood pressure. But instead of writing the information on an observation chart, they will input it into an iPad or computer tablet. An Early Warning Score will then be calculated automatically and displayed instantly. The nurse will use this score to help decide whether medical intervention is needed.

Researchers in the University of Oxford's Institute of Biomedical Engineering (IBME) and clinical staff from the OUH Trust, in particular Intensive Care Medicine specialists Drs Peter Watkinson and Tim Bonnici, have worked in close collaboration to develop the system. The EPSRC-funded Centre for Doctoral Training at the IBME is also enabling the study of the clinical impact of the new system at first hand across a variety of wards.

"The new system will help nurses, who work in busy, high-pressure environments, care for patients more efficiently and effectively," says Professor Lionel Tarassenko, Professor of Electrical Engineering, who leads the project.

"The traditional chart-based method of recording vital-sign data is susceptible to errors in both recording and analysis of vital signs. This has been shown in multiple studies, including one funded by the Oxford BRC. Furthermore it limits the availability of the data to the bedside, making its sharing across the hospital difficult.

"The new electronic system automatically calculates the hospital's Early Warning Score, a scoring system which we have developed from extensive statistical studies of patient data. This highlights combinations of vital-sign readings which give cause for concern. The system also enables all vital-sign data and scores to be accessed instantly by all relevant healthcare staff, wherever in the hospital they may be."

The new system will help nurses, who work in busy, high-pressure environments, care for patients more efficiently and effectively.

In the future, it is planned to take advantage of next-generation scores tailored to different patient groups, for example those recovering from surgery.

At present, six vital signs are measured to calculate the Early Warning Score: heart rate, respiratory rate, blood pressure, arterial oxygen saturation ('the sats'), temperature and level of consciousness. Details of oxygen therapy and clinical concerns can also be recorded on the iPad at the same time. The system has been designed with the future in mind so that it can easily be extended to include other data, such as blood sugar levels or neurological observations.

"We see the new system as a major step towards the 'digital hospital' in which all sources of patient information are interlinked and all healthcare staff are interconnected. This can only have a positive impact on patient safety," says Professor Tarassenko.

on the WEB Audio slideshow of the research
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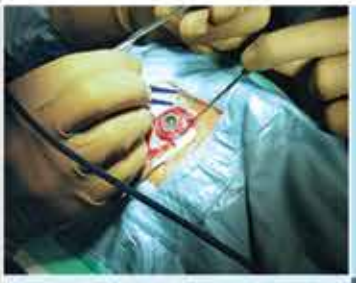

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Luminous ceiling developed to comfort patients

Royal Philips has developed a media enabled luminous ceiling that can simulate energizing daylight to comfort critically ill patients. The LED based ceiling has been introduced into clinical use by the Charité Campus Virchow Clinic in Berlin as part of a unique stress-reducing concept called 'Parametric Spatial Design'. Hospital staff can enter the desired parameters and the large, sky like area creates visuals and light moods customized to the situation of individual patients, enabled by software from ART+COM. The Clinic has implemented the concept in two of its intensive care patient rooms to enhance the healing environment for patients who are severely ill.

Research shows that most people will at least once in their life be treated in an Intensive Care Unit. In many cases the patients' lives are at risk as they await an operation or start to recover after surgery. In this critical phase they often find their surroundings irritating and hostile. Clinical research has shown that factors like loud noise, inappropriate lighting conditions and social isolation can increase the risk of patients in intensive care slipping into a shock-like state.

Until now there has been very little data available about the health-related effects of hospital rooms with a controllable atmosphere. For this reason, intensive care physicians, psychologists and sleep researchers at the Charité Clinic in Berlin will continue to work together with its partners GRAFT architects and the ART+COM design studio to use the integrated spatial concept for research over the coming twelve months. The Parametric Spatial Design concept was developed by GRAFT architects, the ART+COM design agency and the Charité Clinic in Berlin in a joint venture and funded by the German Federal Ministry of Economy and Technology (AiF).

Philips has played a significant role in designing this innovative concept, thanks to its expertise in lighting design and technology.

"We find that particularly in such critical areas as the intensive care department, lighting design is becoming increasingly important in the patient environment," explains Roger Karner, Managing Director of Philips Lighting DACH. Together with our partners we can provide healthcare establishments like the Charité Clinic with turnkey lighting solutions that are tailored precisely to the specific needs of their patients," adds Karner.

LED lighting in the luminous ceiling

The luminous ceiling concept from Philips combines the natural, dynamic rhythm of daylight and the effects of gentle colourful light and visual content. It incorporates 15,400 LEDs and extends from the ceiling onto the wall in front of the patient's bed, and therefore fills their field of view completely.

In addition to the RGB (colour) LEDs, high-performance LEDs with a warm-white and cold-white colour temperature have also been integrated into the ceiling. They are able to produce light output that is comparable with the light from a clear sky in summer. It is this high level of light output that brings the biological effect of light into the intensive care room. It supports the patient's natural day/night rhythm and helps to promote healthy sleep patterns.

How the luminous ceiling adapts to patient needs

The first prototype is now in clinical use. In the new intensive care rooms at the Charité Clinic the medical apparatus has been hidden from view and the level of noise has been reduced. The innovative LED luminous ceiling from Philips adapts to suit the patient's specific wishes: the doctor in charge of the patient's care enters a number of parameters relating to the patient's wellbeing on a tablet PC. A program specially designed by ART+COM controls the screen in such a way that the light is tailored to suit the patient's needs and an appropriate mood is created in the patient room. Amongst other things, live weather updates from the German meteorological office are used to support this process.

Light and its role in enhancing the healing environment

For many years Philips has been researching and developing special lighting systems for hospitals. The advent of digital lighting technology of LED allows an unprecedented level of control of colour temperature and light intensity that has made this new concept possible. Philips has very recently installed its HealWell lighting system in the German Heart Center in Berlin and in other hospitals in Germany, the UK, the Netherlands, Central Europe, Middle East and South East Asia. This system simulates the natural, dynamic rhythm of daylight. A pilot study carried out in conjunction with the University Clinic in Maastricht has researched the effects of this system: HealWell led to improvements in the quality of sleep of patients, enhanced mood and a rise in satisfaction levels among patients and healthcare workers. MEH

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Unveiled the same week as The International Day of Radiology, this versatile offering is ideal for urgent care centers, imaging clinics and a broad range of physicians and specialists, including orthopaedists, podiatrists and chiropractors. The new software is available worldwide.

"We offer a flexible platform for customers who want to move from CR to DR or from film to digital imaging. Our software offers the same user interface and workflow for both modalities, which reduces training time and makes the transition easier," said Heidi McIntosh, Carestream's Global Marketing Manager for X-ray Solutions. "Existing Image Suite users can upgrade to DR technology with a minimal investment because they keep the same console and software platforms and just add a DR detector and license."

The software now supports images captured by Carestream's wireless DR systems using the DRX-1 and new small format DRX 2530C (25 x 30 cm) detectors, as well as Carestream's tethered TDR 3543 detector and TDR 3543C detector that are available in select markets. This is in addition to the current support of the DIRECTVIEW Classic CR and the DIRECTVIEW Vita family of CR systems.

Carestream's optional mini-PACS delivers advanced reading and reporting tools – and the newest software also delivers the ability to view imaging studies on mobile tablets such as iPads in select countries outside of the U.S. The system also supports a wide variety of specialty measurement tools including Lippman-Cobb angle, goniometry and coxometry.

Other new Image Suite software upgrades include:

- Vendor-neutral exposure index value for each image so technologists can see if they are within the exposure range.
- Hardware and software that can automatically acquire DAP and technique information from multiple vendors' generators and DAPs. This eliminates the need for manual data entry; and
- Supports transfer of images to OrthoView software for pre-operative orthopaedic planning and templating.

Software supports enhanced image sharing capabilities

Image Suite also features new CARESTREAM OmniLink Software that can provide secure Web-based transmission of imaging studies and deliver many of the capabilities of a virtual private network at a fraction of the cost. OmniLink Software enhances the sharing of images by offering rapid transmission speeds, high-level security features, and the ability to compress and encrypt files for transmission. This software notifies the sender and receiver when an imaging study is received and alerts the sender if the file is not received. It also supports transmitting image to a PACS using cell phones or mobile devices for healthcare facilities outside of the U.S.

Image Suite systems provide DICOM storage for MR, CT and ultrasound exams and reporting software allows users to create, edit and view reports attached to studies. Users can output imaging exams to CD/DVDs, DICOM printers and other PACS systems. Imaging services providers of all sizes can minimize capital investment and achieve obsolescence protection by purchasing PACS, image sharing and vendor-neutral archiving on a pay-per-use basis with Vue for Cloud-Based Services.

- For more information, visit: *www.carestream.com.*

Welch Allyn solutions designed for use in settings requiring portability, flexibility, efficiency and patient safety

Welch Allyn, a leading global provider of medical diagnostic devices, recently introduced several new solutions designed to help improve patient outcomes including a new connected electrocardiograph (ECG), integrated light-emitting diode (LED) lamp technology and a disposable single-patient-use blood pressure cuff.

The user-friendly Welch Allyn CP 150 was designed to help improve practice workflow. The seven-inch, color touch-screen display with an integrated user interface eliminates the need to track between the display and keyboard and allows for fast and easy entry of patient data helping to save time and reduce errors. A lead quality display is also incorporated into the touch screen, which helps easily and efficiently identify lead connection problems. An instant-on feature powers up the device quickly to take an ECG at a moment's notice and the advanced filters provide optimal ECG trace quality to ensure accurate readings. The CP 150 can be transported easily with the battery-powered operation and up to 100 test results can be stored on the device. ECG results can also be transferred directly to a USB memory stick for additional storage or uploaded to the practice's data management system through the Welch Allyn CardioPerfect Workstation.

Now available to customers outside the United States and Canada, optional LED lamps will be offered in the company's four most popular core diagnostic device platforms—traditional otoscopes, MacroView otoscopes, traditional ophthalmoscopes, and PanOptic ophthalmoscopes. The efficiency of LED lamps also results in lower temperature output which may increase comfort for both the patient and the caregiver. Welch Allyn LED lamps feature patented SureColor technology, which provides consistent color output while light intensity is lowered to improve the view or increase patient comfort. It allows the color of the light to remain the same even as the light intensity is dimmed.

Welch Allyn FlexiPort EcoCuffs are designed to remain with one patient for the duration of the hospital stay and then be disposed of upon release. As part of the FlexiPort line of disposable blood pressure cuffs, EcoCuff utilizes the FlexiPort single-point connection standardization system, allowing the EcoCuff to follow the patient into virtually every room and connect to nearly every device in the hospital. The lightweight EcoCuff is made of 100 percent polypropylene and does not contain BPA, DEHP, Latex, PVC or other materials that can leach into the environment in a landfill or release harmful chemicals when incinerated. EcoCuff is capable of being recycled in areas where polypropylene recycling is available.

- For more information, visit: *www.welchallyn.com*

Walmark is a leading producer of food supplements

Walmark is a leading producer of food supplements in Central and Eastern Europe. The company has one of the most modern pharmaceutical plants in the Czech Republic complying with GMP standards. It has a strong market position in the domestic Czech market as well as in another 7 European markets through its subsidiary companies (Slovakia, Poland, Hungary, Romania, Bulgaria, Lithuania and Latvia). Besides the domestic market and subsidiary markets, there are systematically developed business activities in more than 30 countries in Europe, Middle East, Asia and Africa.

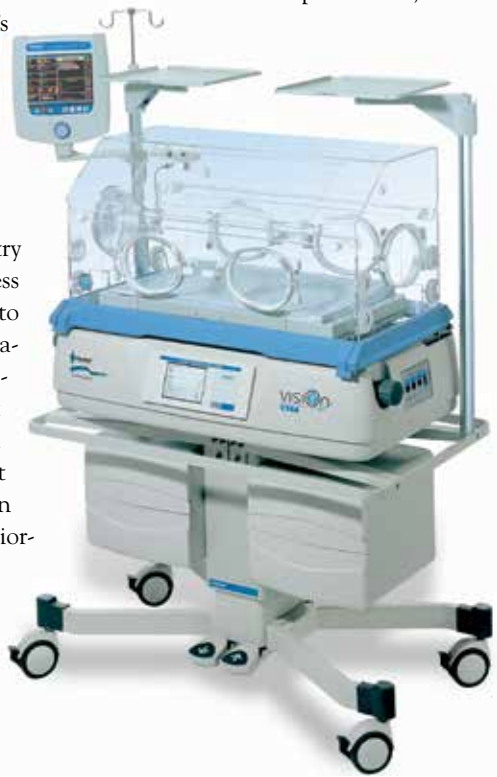
Walmark has a comprehensive product portfolio. The product portfolio is constantly modified according to global trends on one side and to particular needs of customers on the other side.

One of the significant novelties in Walmark's product portofio is Spektrum Gummies – a complex of vitamins in balanced proportions for adults in gummy form which is so easy to use. Every day you can get the key essential vitamins in order to maintain physical and mental vitality. Spektrum Gummies is available in two delicious fruit flavours with no artificial colours.

- For more information, visit: *www.walmark.eu*

Fanem to exhibit their neonatology products

Fanem, a leading manufacturer of neonatology products, will once again participate in the Arab Health Fair 2014, in the Brazilian Pavilion, exhibiting its advanced products that increase the efficiency of health services and the efficacy of health treatments. The software update of the Fanem Vision Advanced 2286 Incubator will be a highlight during the event, equipped with fourth generation (G4) technology that permits a higher data processing speed, better screen response time and visualization of the parameters, which enhances the user's operation. The alarm management system, incorporated into the update, brought to the Vision Advanced 2286 Incubator an evolution of pulse oximetry monitoring, enabling less alarm triggers related to saturation (SpO2) measurements, thus reducing undue triggering. It also counts on an alarm sound volume adjustment and a distinction between low, medium and high-priority alarm settings.



- For more information, visit: *www.fanem.com.br*

Timesco at forefront of laryngoscopes design, manufacture

Timesco Healthcare, England, has been at the forefront of laryngoscopes design, manufacture and innovative developments in intubation for over four decades.

Timesco manufactures the world's number one single use disposable fibre optic laryngoscopes system "Callisto", which is complemented with Callisto single use and Optima reusable LED handles.

Complete ranges of single use, "Callisto", "Europa" and reusable "Optima", "Sirius" laryngoscopes systems covering from neonate to adult intubation, as well as specialist, Robert Shaw, Seward, and difficult intubation "Eclipse" tilting tip blades are available.

The Timesco Laryngoscope programme is also available with a new Rechargeable system. Timesco has also added innovative, award winning, energy savings systems for extended battery life, EES and ION.

The Timesco Laryngoscope programme is part of Timesco product ranges which cover all disciplines of surgery. Timesco surgical and medical ranges cover premium O.R. quality Surgical Instruments, Dental, Electro surgery, Diagnostic, EMS etc

Timesco has been established since 1964 and is one of the largest privately owned quality surgical and medical companies in UK. We are approved suppliers to many MOH's throughout the world including the NHS in UK.

We have regional distribution in the Middle East and have an office in Dubai.

Contact the manager, Misbah Jabbar, email: *misbah.jabbar@timesco.com*, phone: 00971 508 451019.

Timesco is an ISO, FDA, CE and SFDA registered company.

- Arab health: **Z1G30**
- For more information please visit: *www.timesco.com*

Richard Wolf introduces integrated operating room management system

Richard Wolf will present, during the Arab Health in Dubai, the first fully network-based integrated OR core nova as well as the compact media management platform core.media and core.expert – a comprehensive operating room management system.

Richard Wolf is setting new benchmarks in 3D endoscopy with its ENDOCAM Epic 3D HD a high-resolution 2x3-chip system.

Furthermore, Wolf will also launch two new flexible sensor ureterorenoscopes – BOA VISION and COBRA VISION.

Richard Wolf is a mid-sized company manufacturing medical instruments. It employs a workforce of more than 1,400 and maintains a global network of 14 subsidiaries and 130 foreign representatives. The company develops, manufactures and markets a large range of products for minimally invasive surgery and endoscopy in human medicine, and for extracorporeal shock wave lithotripsy and technical endoscopy.

The core nova from Richard Wolf

● For more information, visit: *www.richard-wolf.com*

CTK Biotech obtains worldwide exclusive license from CDC for use of patented, chimeric virus in dengue diagnostic tests

CTK Biotech, Inc. and the United States Centers for Disease Control and Prevention (CDC) have reached a license agreement that grants CTK the worldwide-exclusive, diagnostic commercial rights to a patented dengue virus developed by a CDC laboratory.

Utilizing this advanced technology, CTK has recently launched an improved line of its OnSite Rapid Tests for the detection of anti-dengue IgG and IgM in serum, plasma and whole blood specimens. Previous generations of dengue diagnostic tests were limited in their ability to detect IgM which is particularly important during the early stage of dengue infection when it is the predominant disease marker.

"The chimeric virus developed by the CDC has the potential to dramatically improve the diagnosis of dengue virus infection," said Ta-Hsiang Chao, PhD, Director of Research and Development at CTK Biotech.

"It preserves all antibody binding sites on the viral surface, a critical factor for detecting both IgG and IgM produced in response to the native virus. The improved capacity to detect, diagnose and treat dengue is particularly significant as the global spread of dengue continues. An estimated 400 million dengue virus infections occur annually; 40% of the world's population lives in areas with dengue virus transmission."

While Southeast Asia typically bears much of the global burden, dengue virus transmission is common in 100 tropical and sub-tropical countries around the world, including Asia, the Pacific, the Americas, Africa and the Caribbean. In 2013, Europe experienced its first sustained transmission of dengue fever since the 1920's. Until a safe and effective dengue vaccine is available, further spread of the virus is inevitable.

Joel Heidecker, Vice President of Marketing and Sales at CTK Biotech, reinforces the importance of virus detection when trying to control the spread of a disease, stating: "Early identification and distinguishing between primary and secondary infections can lead to early treatment aimed to limit the severity of the disease, an important step in reducing mortality rates. Our top priority at CTK is to develop high quality, cutting-edge point of care diagnostic products that effectively respond to the needs of the population. Our recent partnership with the CDC positions us at the forefront of the IVD market with the advantage of using the most advanced dengue technology for our research."

CTK Biotech, Inc. is a privately-owned biotech company located in San Diego, California that develops and manufactures innovative immunodiagnostic tools and point of care in vitro diagnostic test kits for distribution in more than 60 countries. CTK's product lines include OnSite Rapid Tests, ELISA Test Kits and Positivia External Controls specialized in blood borne, tropical/parasitic, hepatitis, respiratory, gastrointestinal, sexually transmitted and hormone/neonatal diseases. CTK facilities are ISO 13485 certified and in compliance with Food and Drug Administration Quality System Regulations.

- For more information, visit: *www.ctkbiotech.com*

HI-CARE, the TLV Healthcare ultimate OT media bridge

This suspended media bridge optimizes the quality of surgical interventions by providing surgeons, anaesthetists and operating room staffs an easy access to power supplies, communication technologies and data transfers, medical gas that can be easily positioned hand reach according to each procedure, thanks to the amazing flexibility offered by its eight internal and external sides thanks to its innovative rotating corners system.

The HI-CARE can be adapted to suit any multi-disciplinary operating theatre as each one is individually tailor-manufacture to perfectly fit dimensions and organisation of this high risk area.

In one single unit, HI-CARE combines energy distribution, equipment carriage and peripheral lighting of the area...

Perfectly adapted equipment

To comply with all international norms and standards, the HI-CARE suspended distribution beam is specifically designed and manufactured to meet the specifications of each customer: extra low voltage/low voltage electric currents, medical gas alarm monitoring, any brands and standards on internal and/or external beam sides, rail(s) and tube(s) on internal and/or external faces of the unit, cover(s) and/or tube(s) on the housing using the whole length of the beam.

Easy access to functionalities

The recommended under-beam height (2000 mm) allows easy access to the features, which are within hands reach of all staff members while keeping the distribution unit compact. The HI-CARE thus contributes to the quick availability of the room for the next intervention in the multidisciplinary operating theatres.

Operating room turnover

The rotating corners with indexation enable rapid modification of equipment positioning and therapy devices between two operations, ensuring the benefit of an optimised workspace for anaesthetists, surgeons and their staffs.

Hygiene

Compatible with all ceiling laminar air flow systems thanks to its tailor-made design, the HI-CARE contributes to the fight against nosocomial infection by protecting the air flow from turbulence since all additional shielding is designed by aeraulics specialists.

Cleaning and decontamination

The smooth shapes and surfaces allow easy cleaning and decontamination between two operations.

Maintenance

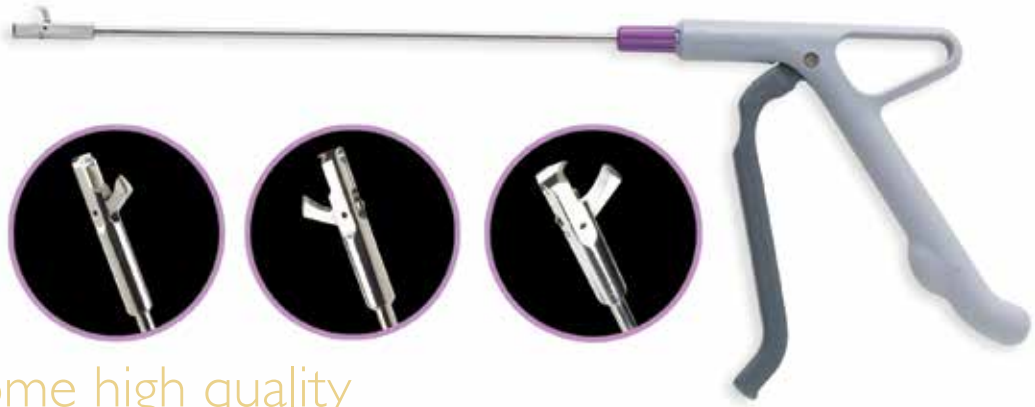
The technical equipment fixed at the back of the unit with direct access through dedicated clipped covers procures quick maintenance, optimizing the availability of the operating rooms.

RGB (Red Green Blue) Lighting

Indirect integrated lighting on the upper part of the HI-CARE beam provides comfortable vision for the different members of the operating staff whilst enabling peripheral tasks to be safely carried out. The comfort provided by the different dimmable colours of the LED lighting system offers infinite possibilities for the patients emotional management (red light relaxes, blue stimulates) as well as improved vision (green for endoscopy, x-rays).

● For more information, visit: *www.tlv.fr*

DTR Medical



Clinicians welcome high quality single-use cervical biopsy punch

Showcasing at this year's Arab Health, DTR Medical's Rotating Cervical Biopsy Punch is a timely development in light of the increasing need for cervical cancer screenings and human papilloma virus (HPV) testing.

This cost effective solution not only ensures clinics can run smoothly through improved instrument availability, but guarantees a good quality biopsy every time. It is clear to see why it has been received so well in the market, with notable positive feedback including:

"The rotating punch biopsy is slick, easy to use and sharp"

"The reusable forceps [biopsy punches] consistently produce inadequate samples - cross-cut, crushed or torn - this causes confusion and further unnecessary follow-up. I want to use these disposable forceps [Single-use biopsy punch]"

The rotating jaw provides first time sharpness and a precise cut with a cleaner wound that heals quickly. Alternatives commonly lack a precise cutting jaw, creating poor biopsies with continued wound trauma which leads to longer patient recovery time.

This addition to an extensive range of Single-use gynaecology instruments is a truly 'fit-for-purpose' instrument that can enhance existing procedures.

- For more information, visit: *www.dtrmedical.com*

Mediflex to show open and laparoscopic surgery products at Arab Health

Mediflex is a pioneer in the surgical retraction field having worked with Dr. Mel Greenberg in the 1960s and Dr. John Bookwalter in the 1970s to design and manufacture neuro and general surgery retractor systems. Mediflex is committed to global and regional improvement of the quality and safety of healthcare. Mediflex has a presence in over 50 countries, and has participated in Arab Health annually since 2010.

Nathanson StrongArm Liver Retraction System

The system includes a Single Arm StrongArm Holder and Positioner along with 3 Nathanson Hooks and 2 Instrument Tips. The hooks and tips feature the Mediflex hexagonal fitting and can be easily attached to and removed from any Mediflex surgical holder and positioner with the quick disconnect feature. The system attaches to operating table rails. It offers height adjustability and the ability to position the Nathanson Hook at different lengths and angles. A single central locking knob secures the system in a matter of seconds. The height adjustability also allows the vertical post to be lowered so it no longer obstructs the surgeon or assistant. This system is especially suited for bariatric procedures.

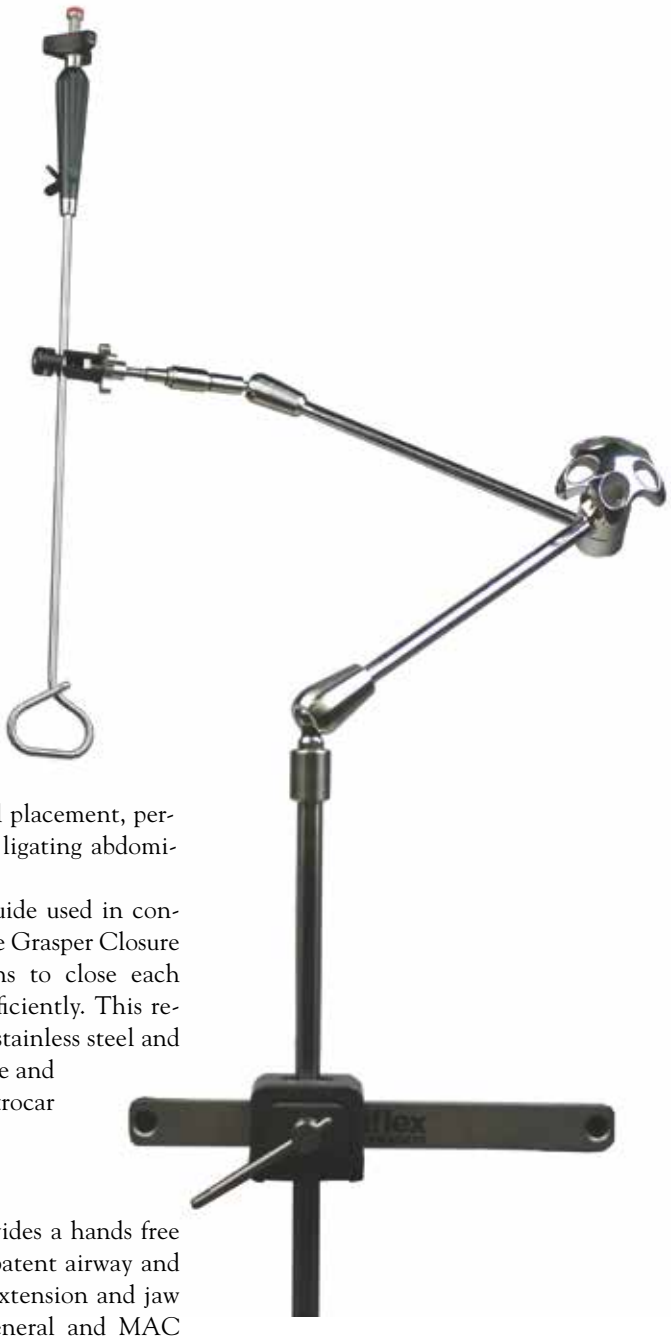
Lapro-Flex Articulating Retractors

These retractors can be introduced through a 5mm cannula and articulated to their shape by rotating a knob in the handle. They are available in several different configurations including right angle, triangular and angled triangular.

Suture Grasper Closure Device and Suture Passer Guide

The Suture Grasper Closure Device is disposable and used for laparoscopic fascia, tacking hernia mesh in position prior to final placement, percutaneous suturing and ligating abdominal wall bleeders.

The Suture Passer Guide used in conjunction with the Suture Grasper Closure Device enables surgeons to close each trocar site safely and efficiently. This reusable guide is made of stainless steel and allows for a cost effective and reliable solution for trocar site closure.



Airway-Assist

The Airway-Assist provides a hands free method to maintain a patent airway and holds consistent neck extension and jaw thrust during Mask General and MAC anesthesia. It also provides an additional "hand" during laryngoscopy and allows precise external manipulation of the glottis for better visualization. It also applies cricoid pressure during rapid sequence anesthesia induction.

- Arab Health: **1B56**
- For more information, visit: *www.mediflex.com*

ALLIBERT MEDICAL offers innovative French design for modular hospital furniture

ALLIBERT MEDICAL, with over 20 years' experience, designs and manufactures in France a smart range of hospital furniture with a low ecological footprint. To provide an efficient organisation, logistics and storage solution in all hospitals areas (OR, ICU, ER, wards and in-patient pharmacies), ALLIBERT MEDICAL emphasized in its conceptions the importance of cutting-edges technologies, modularity, hygiene and safer.

Those unique features and innovative concept set ALLIBERT MEDICAL apart from the competition:

"P20": an upgrading modular concept: A modular system with total interchangeable components permits to upgrade your trolley in time. The new EasyClip side rails designed by Allibert Medical allow users to choose their own configuration whatever their scope of interventions (emergencies, anaesthesia, exams, bandaging). The special right-Left sliding shelf provides to end-users more comfort during treatment process.

Durability concept : All materials were chose for their long value durability; body frame in aluminium, top tray in ABS, drawers in anti-microbial polypropylene. Easy maintenance is provided through a concept of sliding and removable drawers without mechanical ball-bearing rails system.

EasyClean: To reduce nosocomial infection, ALLIBERT MEDICAL develops a unique concept allowing a quick dismantling of the products without tools for a full decontamination process. Last innovation, the top tray is completely removable for cleaning.

Universal Design: Daily tasks are made easier thanks to many features as light-weight aluminium frame and ergonomic design . A wide range of attractive color options bestows a modern atmosphere inside hospitals.

Keyless Concept: Improving safety and reducing medication error is part of our achievements. The intelligent electronic lock, which allows track user activity, remains a guarantee for a safe and controlled storage of medicines.

On the strength of its experience, ALLIBERT MEDICAL offer its know-how to serve your equipment projects. Contact us at *export@allibert-medical.com*

The Infinium Omni III patient monitor

Designed for a fast paced work environment, the Infinium Omni III patient monitor offers an extremely simple and adaptable user interface. Patient information along with vital sign settings can be quickly modified to meet the needs of a patients changing condition. The Omni III offers a standard high resolution 15 inch touch screen to optimize the speed of patient care. The user can therefore make quick screen adjustments, set default settings, alarm limits, and manage up to 72 hours of detailed patient data.

Upgradable

From the general floor to high acuity surgeries, the Infinium Omni series patient monitors are designed to fit-in and move amongst many patient care areas. The Omni III offers standard measurements of: non-invasive blood pressure, ECG with arrhythmia detection, motion tolerant SpO2, Temperature, and Respiration rate. End-tidal Co2, Anesthetic Agent measurement, 12 lead ECG, Cardiac Output and Invasive blood pressure can added on-site by simply attaching our plug in modules. This field upgradability can allow the user to customize the monitor's acuity level while the patient's condition changes. If desired, the user can move from a basic vital signs monitor, to a continuous bed side monitor, to an operating room monitor while keeping the patient on a single monitor at all times.

Connective

The Omni III offers several connective solutions to network multiple monitors and/or manage patient data on an electronic medical records platform or a HL7 based hospital information system. The Omni III patient monitor offers Ethernet and RS-232 connections with an open source communication protocol. Infinium offer 2 levels of networking and connectivity. The Omni III is HL7 compliant. The HL7 network protocol will allow for all patient information and vital sign trends to be transferred and stored on a hospital information system. For non-HL7 medical facilities, there is the Infinium Omniview central station which allows the real time remote monitoring and network of up to 64 Omni patient monitors. The Omniview archives full disclosure of all patient vital sign trends. The patient data from the Omniview can be very simply saved, stored, printed, and, transferred.

- For more information, visit: *www.infiniummedical.com*

DM Systems introduces Heelift AFO

DM Systems introduces the redesigned Heelift AFO, a unique ankle foot orthosis designed to offload the heel while also providing superior foot drop support. Having introduced the first heel offloading boot of its kind, Heelift Suspension Boot, DM Systems has established a reputation as a global leader in the prevention and treatment of heel pressure ulcers. DM has applied that expertise to the traditional AFO, producing a softer, gentler solution. A smooth fabric cover and forefoot strap help to keep the boot in place by allowing the boot to move with the patient while the patient is in bed.

"Instead of creating 'just another AFO', we wanted to create a product that solves multiple problems," said DM Systems" founder Denis B. Drennan, MD.

A non-slip sole allows patients to walk short distances (preferably with assistance), meaning the boot does not have to be removed and reapplied each time the patient is transferred from the bed or wheelchair.

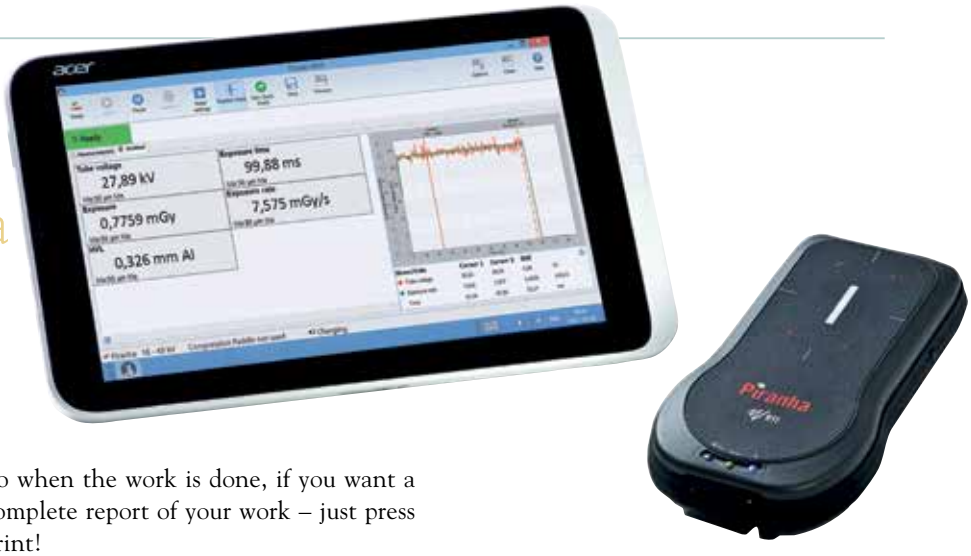
Along with its offloading capabilities, Heelift AFO is indicated for:

- Dorsiflexion ankle support for paralyzed legs
- Use as a comfortable night splint
- Treatment/prevention of plantar flexion contracture
- Treatment of plantar fasciitis
- Treatment/prevention of foot drop deformity
- Treatment of Achilles tendonitis

Founded in 1979, DM Systems is committed to quality outcomes across the continuum of care with innovative products developed by orthopedic surgeons to reduce wound prevalence while saving time and money. Other products include the Heelift Glide, Heelift Suspension Boot, and HeelSafe DVT Hose.

- For more information, visit: *www.heelift.com*

Simply Plug n Play – with RTI's Black Piranha



The new RTI Black Piranha brings a quickness and power to your X-ray QA work flow. The Black Piranha includes what you would expect in a multifunction meter. Connection to various accessories, tablet and PC is automatic – just plug n play. The Quick Check feature identifies the probes you insert and selects the optimum Piranha settings for your measurements. You can even easily program your own default start-up screen. The Black Piranha can measure on Rad, Fluoro, Dent, Mammo, and CT.

The Black Piranha is complimented by the Ocean 2014 software which makes your workflow more intuitive and work will move quickly. Ocean 2014 can perform instant real-time analysis during your measurements. Ocean also prepares a report in the background as you go. So when the work is done, if you want a complete report of your work – just press print!

Use your tablet/laptop as both an interactive display during the measurements and as a powerful analysis tool when you are back at the office. No unnecessary, time-consuming data-transfer at the end of the day.

Measurements and data are stored – allowing for analysis, trending and printed reports – even months after you have completed your measurements.

Ocean 2014 also features Quick Check mode. This Ocean 2014 feature provides a quick and easy way to start your measurements. Simple and accurate measurements along with data and waveforms are instantly displayed. Templates are provided. Just power-up and go.

Whether you use a Windows tablet (Windows 8 Pro tablet) or laptop, this will be an indispensable QA tool.

- For more information, visit: *www.rti.se*

The Intersurgical i-gelO2 Resus Pack contains all you need

In emergency medicine, you need equipment that's easy and rapid to use. The i-gel O2 Resus Pack contains everything you need to prepare, insert and secure the i-gel O2 quickly and efficiently: an i-gel O2 supraglottic airway, a sachet of lubricant, airway support strap and a suction tube.

The i-gel O2 has been specially designed to facilitate ventilation as part of standard resuscitation protocols, such as those designated by the European Resuscitation Council (ERC). However, the i-gel O2 also incorporates a supplementary oxygen port for the delivery of passive oxygenation, or Passive Airway Management (PAM), as part of an appropriate Cardio Cerebral Resuscitation (CCR) protocol.

A number of case reports and clinical studies have highlighted the potential advantages our standard i-gel device offers in the resuscitation scenario1,2,3,4, where seconds can make all the difference. With its unique, soft, non-inflatable cuff, valuable time is not wasted deflating and inflating a cuff. This allows a patent airway to be established in the quickest possible time. In many cases, insertion can be achieved in less than five seconds5.

With our new i-gel O2 Resus Pack, you have all the advantages of a standard i-gel in the new i-gel O2, along with everything you need to prepare, insert and secure the device in one pack, allowing you to stay focused on what really matters during resuscitation – the patient.

References:

1. Gatward JJ, Thomas MJC, Nolan JP, Cook TM: Effect of chest compressions on the time taken to insert airway devices in a manikin: Br J Anaesth. 2008 Mar;100(3):351-6
2. Gabbott DA, Beringer R: The i-gel supraglottic airway: A potential role for resuscitation?: Resuscitation. 2007 Apr;73(1):161-2.
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4. UK Resuscitation Council Advanced Life Support Guide (5th Edition). Revised June 2008.
5. Bamgbade OA, Macnab WR, Khalaf WM: Evaluation of the i-gel airway in 300 patients. Eur J Anaesthesiol. 2008 Oct;25(10):865-6.

- For more information, visit:

www.intersurgical.com
www.i-gel.com

HARD Manufacturing launches new critical care crib

HARD Manufacturing is introducing its newly designed Doernbecher II Critical Care Crib. The Doernbecher II Critical Care Crib is specifically designed for the PICU when a Safety Top is necessary for the patient who may become more active. When the Safety Top is not needed, the Doernbecher Critical Care Crib is available for the PICU.

HARD Manufacturing manufacturers and sells cribs as small as 61cmx91cm Cribette for the NICU to as large as a 91cmx211cm Youth Bed for the Pediatric patient population. Every Electric Crib we manufacture has the availability of the optional built in Weigh Scale. The Weigh Scale has the accuracy rate of +/- 0.1kg. All Pediatric Cribs and Youth Beds are standard with an Anti-Microbial Epoxy Coating.

Since 1876 the HARD commitment to quality, performance, and value has never changed. Through continuing improvements and developing new technologies, the HARD goal is to maintain its earned position of leadership. Only in this way, can HARD Manufacturing continue to serve the Healthcare marketplace with products that meet its ever-demanding needs.

HARD Manufacturing is the world's #1 manufacturer of Hospital Cribs and Youth Beds.

- Arab Health: US Pavilion # **1A42**
- For more information,

visit: *www.hardmfg.com*

Analox are launching the Medical ACG, a revolutionary medical gas monitoring system

The Medical ACG can be used for continuous or spot check testing of O2, CO2, VOC's, CO, H2O, SO2, NO and NO2 all in one system. This enables users to check gases such as: Medical Air, Medical Grade Oxygen and Nitrous Oxide and to verify compliance with industry standards such as the European Pharmacopeia, NFPA99 and HTM 02-01.

The Medical ACG is easy to install and maintain and offers peace of mind and better safety for patients. Its Datalogging feature also offers full traceability and negates the need for manual recording or external testing.

It is the perfect solution to ensure compliance with mandatory legislation and duty of care. The system can be used in numerous applications such as: COPD (Chronic Obstructive Pulmonary Diseases) Treatment, ARDS (Acute Respiratory Distress Syndrome), Cardiac & Trauma wards and Neonatal units.

Analox also offer a wide range of laboratory gas safety products including Oxygen depletion monitors, portable and fixed CO2 detectors, flammable gas sensors and OEM sensor technology.

- For more information, visit: *www.analox.net*

Combating hypothermia and pressure related tissue trauma through warming and true pressure relief

Whether it's the development of post-operative pressure ulcers or complications from perioperative hypothermia, patients face a wide range of risks from prolonged surgical procedures.

That's where TABLEGARD comes in. This revolutionary patient care system from BERCHTOLD is the only OR table mattress that provides both pressure management and warmth during surgery. The result is a significant reduction in pressure-related sores and ulcers, as well as anaesthesia-induced hypothermia.

TABLEGARD's innovative design is based on the body's own physiology, mimicking the peristaltic motion of muscles to generate even, gentle movement in 15-minute cycles throughout an extended procedure.

TABLEGARD is also changing the way surgical teams maintain safe core temperatures during procedures, especially with today's ORs being kept extremely cold to prevent cell death. BERCHTOLD's integrated system produces a surface temperature range of 28-43 degrees C, helping reduce the risk of perioperative hypothermia.

- For more information, visit: *www.berchtold.biz*

Are you still using BVMs?

In the pre-hospital environment bag valve devices have been the standard of care for the past 50 years. However, because a bag valve device requires constant and steady manual pumping by the operator, it does not guarantee consistent air delivery. The operator is literally setting the tidal volume and respiratory rate with every squeeze of the bag. Unsurprisingly, BVMs have been linked to a high incidence of hyperventilation and gastric insufflation. In addition to the safety concerns of bag valve devices, bagging completely incapacitates a responder from addressing other injuries, performing compressions, attending other patients, or transporting the patient.

So why are BVMs still the standard of care? They are the standard of care because transport ventilators are either too expensive or too complicated to be widely used. A ventilation device that mitigates the potential for injury, reduces operator error, complies with guidelines, and improves a medical responder's ability to perform other critical tasks is needed.

Just as AEDs made their way from the hospital, to ambulances and eventually to public places, ventilators need to evolve to become smaller, easier to use and more affordable. Simplified Automated Ventilators, originally designed to triage critically injured soldiers on the battlefield, may be the answer. The second generation Simplified Automated Ventilator (SAVe II) is a hybrid between a bag valve device and an expensive transport ventilators. Like many transport ventilators, it is compressor-driven and has an array of sensing capabilities and safety alarms. However, it requires minimal training and uses a height chart to dial in an appropriate initial tidal volume for the patient. It only weights 1.1 kg and can deliver air for up to 10 hours. It's simple and reliable ventilation for the pre-hospital environment.

The SAVe II is produced by AutoMedx and distributed in partnership with JD Honigberg.

- For more information, visit: *www.automedx.biz*

Carrier arms from CIM med to connect anesthesia machines now TÜV- tested

CIM med has announced successful TÜV testing of its carrier arm for the Philips IntelliSave AX700 anesthesia machine. These results support CIM med's ambition to produce the safest clinical mounting systems on the market. CIM med will be exhibiting its new carrier arm solutions at the Arab Health in Dubai, January 27-30, 2014.

TÜV Süd, the German safety monitoring agency, examined the CIM med carrier arm for two core criteria. The ground cable connections were tested for impedance and current load capacity (testing specifications IEC 60601-1:2005). Component grounding inside the carrier arms provides the required safety. TÜV Süd also tested the system for stability at a 10-degree tilt when fully euipped (DIN EN 60601-1:2007). The extra-length, triply articulated and height-adjustable, 700-millimeter arm features a special bracket to limit the pivoting arc of the first articulation to 90 degrees. This ensures tilt safety even when carrying 22 kilograms.

The carrier arm is available with connections for PDMS and patient monitors with modules. An authorized service technician can help health facilities retrofit the Philips IntelliSave AX700 with a CIM med carrier arm at any time. TÜV-certified carrier solutions by CIM med are also available for anesthesia machines by other manufacturers.

- Arab Health: Z3D19
- For more information, visit: *www.cim-med.com*

Hill Rom's Progressa Bed System has groundbreaking technology

Progressa Bed System is more than just a bed. With the help of the Progressa Bed System's integrated functionality and lift system, caregivers can maintain optimal therapeutic positioning, deliver evidence-based therapies and help restore mobility to minimize the risk of cardiovascular, respiratory, metabolic and muscular disorders, as well as delirium.

StayInPlace is a ground-breaking technology that is only available with the Progressa Bed System, and prevents patient migration, minimizing the need for patient repositioning.

The Progressa Bed System is the only ICU bed platform on the market that meets the needs of Critical Care patients in different ICU disciplines through upgradability and configurability.

The Progressa Bed System can be configured and upgraded to meet a wide range of requirements within a hospital, while providing a consistently superior user experience. You can decrease total-cost-of-ownership by using ONE supplier to reduce maintenance, spare parts and training costs.

Clinical efficiency provided by the Progressa Bed System:

- Eases the individual steps of Progressive Mobility at every level of patient acuity and tolerance
- Significantly contributes to shortening ICU length of stay
- Enables Progressive Mobility while reducing the risk of adverse events such as line displacement
- Shortens time to first out of bed.
- For more information, email: *eemea@Hill-Rom.com*

Static Systems launch wireless nurse call system

Static Systems' Fusion-IP range of nurse call systems now includes a radio based solution to be shown at Arab Health for the first time. 'Fusion-IP Aspire' is fully compatible with other equipment in the IP range and establishes Fusion-IP as one of the most comprehensive and technically advanced healthcare communication solutions available.

In addition to the company's RNIB endorsed, waterproof patient hand unit, other features that set Aspire apart include a 'two-way' health-check for unrivalled system integrity, and exceptionally low power consumption ensuring extended battery life. Furthermore, in common with other Fusion-IP solutions, Aspire can operate standalone, work alongside a wired system, and, being IP based, can connect with a site's LAN.

In the design brief for Aspire Static Systems were insistent that the look and feel of the devices should conform to that of existing SSG equipment already widely used in healthcare environments. The aim was that patients and staff alike would be familiar with the equipment whether it was wired or wireless.

Other design considerations were that Aspire should be cost-competitive and

easy to set up using an 'out of the box and ready to go' approach that did not necessarily require specialist support.

Commenting on Fusion-IP Aspire, Static Systems' Marketing Manager, Jennie Horrocks said: "We see Aspire as most suited to low acuity environments such as health centres, or as a temporary system for use during ward upgrades. However before recommending a solution we look at client requirements, and based on 'best advice' recommend either a wired or wireless system."

- For more information, visit: *www.staticsystems.co.uk*

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Siemens launches Artis one angiography system for universal use

Siemens recently introduced a new angiography system optimized for a broad clinical utilization. Artis one is designed for routine interventions, which represent most angiographic procedures. Energy consumption with the new system is up to 20% lower than with Artis zee floor.

Thousands of angiographic procedures are performed each day worldwide. On the one hand, these include treatment of highly complex cases requiring a high degree of tailoring of the angiography lab's configuration. On the other hand, there are many routine interventions, which represent the clear majority of cases. These include, for example, revascularizations of peripheral arterial or venous occlusions, functional tests of dialysis shunts (surgical vascular connections between arteries and veins) in patients with kidney failure or of implanted ports in tumour patients.

Diagnostic angiographies of narrowed coronary arteries (coronary stenosis) and their treatment or pacemaker implantations are also established routine procedures.

Siemens Healthcare developed Artis one to support all of these interventions.

Flexible with low space requirement

Despite being floor-mounted, the new angiography system is similar in positioning flexibility to ceiling-mounted systems and requires substantially less space: Artis one occupies only 25 square meters, compared to the usual 45 square meters required by ceiling-mounted systems. The system features several axes which can be moved independently of each other. This allows physicians and hospital staff to easily position the system where needed – regardless of where the physician is standing.

The system covers body heights of up to 2.1 meters without the need to reposition the patient, even for the imaging of peripheral vessels. When necessary, the system allows free access to the patient's

head in order to provide optimal care during the procedure.

Buttons on the table side console are tactile so that they can be easily operated even under the sterile covering. The on-screen menu allows the physician to navigate directly using the heads-up display. All information about the procedure is thus kept right in front of the operator's eyes. The comfortable 30 inch display size delivers images up to 90% larger than conventional 19 inch monitors.

Premium applications, powerful x-ray tube

With Clearstent Live, Artis one offers a feature which until now was only available with the premium family Artis Q and Artis Q.zen. This application for interventional cardiology allows the physician to mask out the movement of the beating heart in order to place the stent in precisely the right position. Furthermore, the new system is equipped with the proven "Megalix" x-ray tube of the Artis zee system family featuring flat emitter technology. Using a tube current of up to 250 milliampere (mA), the system generates images with outstanding quality and high contrast resolution.

In order to keep radiation exposure for the physician and patient as low as possible, Artis one offers the most extensive feature set for dose reduction of any angiography system on the market.

By using 20% less energy than Artis zee floor, Artis one also helps reducing operational costs. This is mainly achieved

Fresenius Kabi presents the new MRI Guard to the Agilia family

As a new addition to the Agilia family, Fresenius Kabi brings the use of the Agilia infusion and syringe pumps into the magnet resonance units where infusion therapy patients can benefit from uninterrupted treatment during an MR procedure. The MRI Guard Agilia prevents interference generated by the Agilia Infusion pumps from affecting MR image quality, and the guard shields the infusion pumps against electromagnetic disturbances from the MRI system.

An indicator tells you where to position the MRI Guard Agilia safely near the patient, at all times during the procedure, with visual and audible signals. Infusion data is stored in the infusion pumps during the MRI procedure.

New accessories and consumables will be introduced during 2014 such as "Ambulance holder", new oncology sets, etc. completing our offer for the Agilia range.

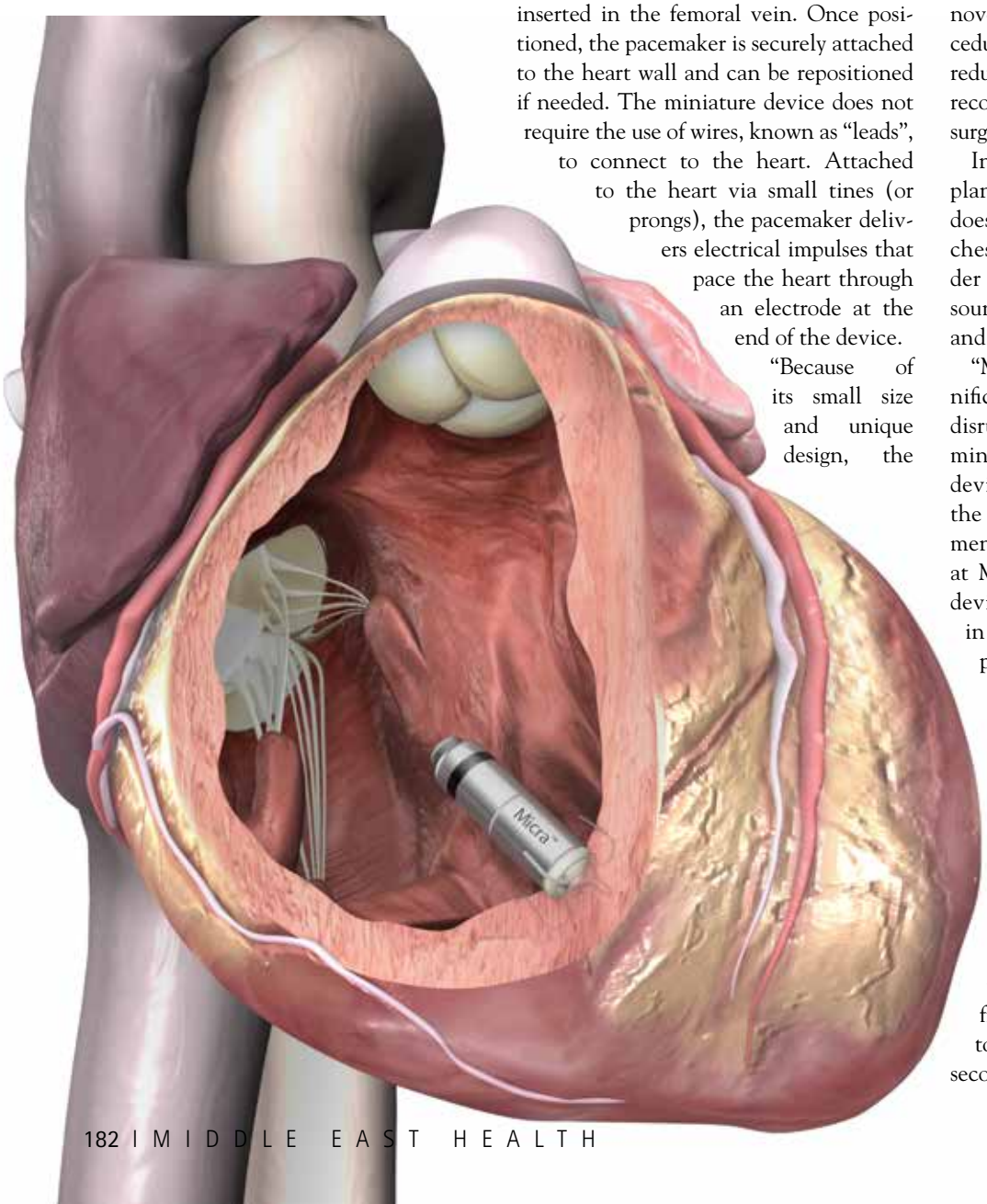
- For more information,

visit: *www.fresenius-kabi.com*
or contact Fresenius Kabi Representative Office Middle East & Gulf:
+971 4 346 75 30

World's smallest pacemaker implanted in patient for first time

In December, Medtronic announced the first-in-human implant of the world's smallest pacemaker: the Micra Transcatheter Pacing System (TPS). The device was implanted in a patient in Linz, Austria as part of the Medtronic global pivotal clinical trial. The Micra TPS is an investigational device worldwide.

At one-tenth the size of a conventional pacemaker, and comparable in size to a large vitamin, the Micra TPS is delivered directly into the heart through a catheter inserted in the femoral vein. Once positioned, the pacemaker is securely attached to the heart wall and can be repositioned if needed. The miniature device does not require the use of wires, known as "leads", to connect to the heart. Attached to the heart via small tines (or prongs), the pacemaker delivers electrical impulses that pace the heart through an electrode at the end of the device.



"Because of its small size and unique design, the Micra TPS can be introduced directly into the heart via a minimally invasive procedure, without the need for leads," said Clemens Steinwender, M.D., head of cardiology at the Linz General Hospital in Linz, Austria. "The combination of this novel technology with a transcatheter procedure can benefit patients by potentially reducing pocket or lead complications and recovery times observed with traditional surgical pacemaker implants."

In contrast to current pacemaker implant procedures, the Micra TPS implant does not require a surgical incision in the chest and the creation of a "pocket" under the skin. This eliminates a potential source of device-related complications, and any visible sign of the device.

"Micra TPS is an example of the significant investment we have made in disruptive technology, specifically the miniaturization of implantable cardiac devices," said Pat Mackin, president of the Cardiac Rhythm Disease Management business and senior vice president at Medtronic. "Less invasive, miniature device technologies show strong promise in improving patient outcomes and implant procedure efficiency. Through our global Micra TPS clinical trial, we intend to generate robust evidence of these benefits to patients and clinicians throughout the world."

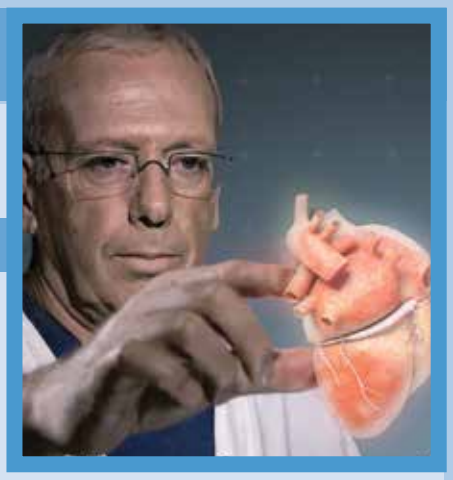
Micra TPS study design

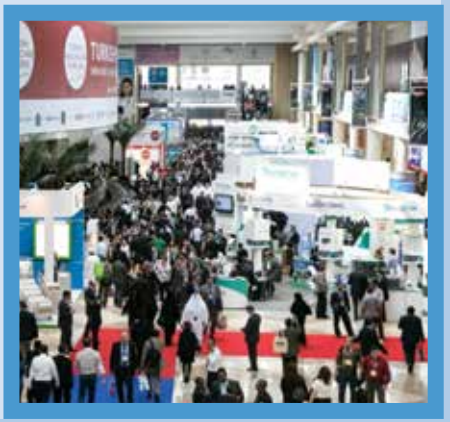
The study is a single-arm, multicentre global clinical trial that will enrol up to 780 patients at approximately 50 centres. Initial results from the first 60 patients, followed up to three months, are expected in the second half of 2014. MEH

Agenda

Selected schedule of regional medical meetings, conferences and exhibitions

Event	Date / City	Contact
JANUARY 2014		
1st Non-Communicable Chronic Diseases Congress in the UAE	9 – 11 Jan, 2014 Dubai, UAE	*www.ncdcongressuae.com/index.php*
5th European Society of Endocrinology Clinical Update	10 – 11 Jan, 2014 Abu Dhabi, UAE	*www.ese-hormones.org/education/clinicalupdate.aspx*
Pan Arab Rheumatology 2014	14 – 17 Jan, 2014 Dubai, UAE	*www.panarabrheumatology2014dubai.com/*
Arab Health 2014	27 – 30 Jan, 2014 Dubai, UAE	*www.arabhealthonline.com*
MedLab Dubai	27 – 30 Jan, 2014 Dubai, UAE	*www.arabhealthonline.com/Medlab*
World Heart Failure Society Congress	28 – 30 Jan, 2014 Abu Dhabi, UAE	*http://www.worldheartfailure.org*
FEBRUARY 2014		
UAE International Dental Conference & Arab Dental Exhibition	4 – 6 February, 2014 Dubai, UAE	*www.aeedc.com*
3rd Biotechnology World Congress	10 – 12 February, 2014 Dubai, UAE	*www.biotechworldcongress.com*
6th International Conference on Drug Discovery & Therapy	10 – 12 February, 2014 Dubai, UAE	*www.icddt.com*
3rd Annual American Society for Nutrition Middle East Congress	19 – 21 February, 2014 Dubai, UAE	*http://asnme.org/index.html*
International Conference on Cardiac Emergencies	19 – 21 February, 2014 Tehran, Iran	*http://www.icce-2014.com/*
11th Gulf Heart Association & 4th Bahrain Heart Association Congress	26 – 28 February, 2014 Manama, Bahrain	*http://gha-bha2014.com/*
9th International Breast Cancer Congress	26 – 28 February, 2014 Tehran, Iran	*http://en.crc.sbmu.ac.ir/*
MARCH 2014		
Middle East Wounds and Scar Meeting	1 – 3 March, 2014 Dubai, UAE	*www.woundsandscarmeeting.com*
Int'l Spinal Cord Injury Conference	4 – 5 March, 2014 Riyadh, KSA	*info@spineconfksa.com* *www.spineconfksa.com*
International Medical Travel Exhibition and Conference	5 – 6 March, 2014 Dubai, UAE	*www.medicaltravelexhibitions.com*





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Selected schedule of regional medical meetings, conferences and exhibitions

Event	Date / City	Contact
Int'l Advanced Orthopaedics Congress	6 – 8 March, 2014 Dubai, UAE	*http://www.aocongress.com/*
Dubai Pharmaceutical & Technologies Exhibition	10 – 12 March, 2014 Dubai, UAE	*www.duphat.ae*
2014 GulfThoracic Congress	13 – 15 March, 2014 Dubai, UAE	*http://www.gulfthoracic.com/*
Patient Safety & Quality Congress Middle East 2014	16 – 19 March, 2014 Abu Dhabi, UAE	*www.patientsafetymiddleeast.com*
ArabLab, The Expo	17 – 20 March, 2014 Dubai, UAE	*www.arablab.com*
Abilities-ME	24 – 26 March, 2014 Abu Dhabi, UAE	*www.abilitiesme.com*
Int'l Emergency & Catastrophe Management Conference & Exhibition (IECM 2014)	25 – 27 March, 2014 Dubai, UAE	*www.emergency.ae*
OBS-GYNE Exhibition & Congress	30 March - 01 April 2014 Dubai, UAE	*www.obs-gyne.com*
APRIL 2014		
Occupational Safety and Health Middle East	1 – 3 April 2014 Abu Dhabi, UAE	*andrew.macgregor@reedexpo.ae*
Dubai Derma 2014	8 – 10 April 2014 Dubai, UAE	*www.dubaiderma.com*
IMTEC OMAN – 2014	15 – 17 April, 2014 Muscat, Oman	*www.imtecoman.com marketing@imtecoman.com*
15th Dubai Spine Conference & 10th Pan Arab Spine Conference	19 – 22 April, 2014 Dubai, UAE	*www.dubaispineconference.com/*
11th Annual Middle East Otolaryngology Conference & Exhibition: Head & Neck Surgery	20 – 22 April, 2014 Dubai, UAE	*http://www.me-oto.com/*
ICJR Middle East 2014	April 30 – May 2, 2014 Dubai, UAE	*www.icjr-me.com*

List your conference:
If you have upcoming conference/exhibition details which you would like to list in the agenda, please email the details to the editor: *editor@MiddleEastHealthMag.com*

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