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September-October 2015

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## Immunity innovation

Ebola, malaria  
vaccine trials yield  
positive results

## German healthcare

Hospitals adapt to attract  
Arab medical tourists

## Paediatric craniofacial asymmetry

Misconceptions and the steps  
that can be taken to correct it

### In the News:

- Iraq's humanitarian health services shut down
- AUBMC wins Grand Challenges Explorations research grant
- Implanted neurons become part of the brain
- The sacrifices of health workers
- Synthetic DNA used to make novel proteins



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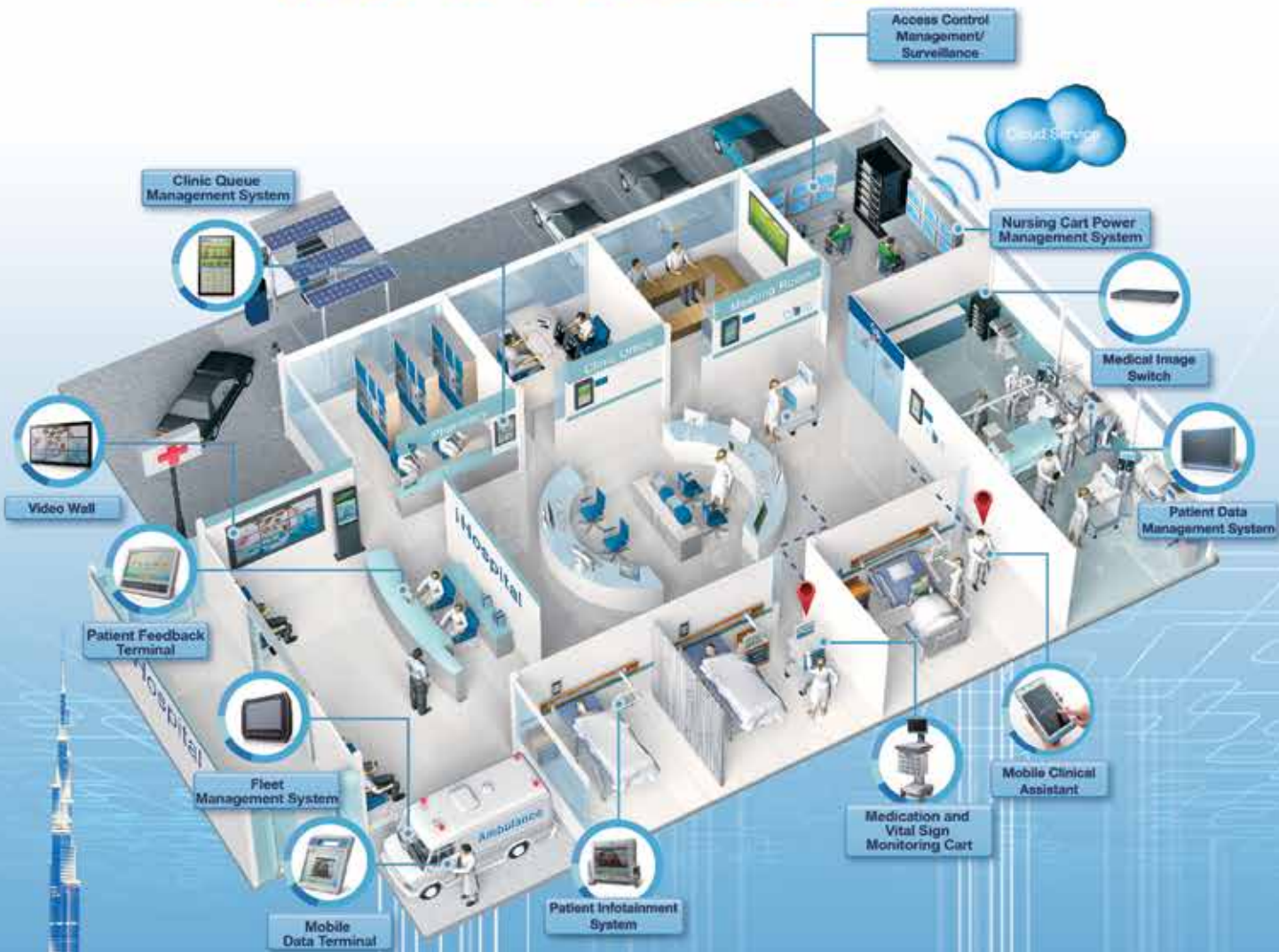


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# Prognosis

## People on the move

Germany has for many years been a destination of choice for Arabs seeking high quality healthcare. It's a significant form of revenue for the country. In total, medical tourism to Germany brings in around US\$1.35 billion annually. Hospitals in the country are aware of this lucrative source of revenue and many have developed specially designed services to cater for foreigners and Arabs in particular. In our focus on Germany, we look at Arab medical tourism to the country and how some hospitals have adapted to facilitate this form of 'tourism'.

In our focus on Jordan we look at the refugee crisis which is placing enormous strain on the country's resources – in particular it's healthcare system. As Syrian refugees continue to seek refuge in the country, the situation is deteriorating and there is an urgent need for funding to sustain many of the NGOs who are working tirelessly to help relieve their desperate plight. Read the report on page 36.

There have been two promising healthcare developments that have made global news recently. One is the development and positive results from a rapid trial of a vaccine for Ebola, which now looks set to provide immunity against the devastating disease. And the other is the development of a vaccine for malaria, the first to be given a nod of approval by European regulators. Read about these developments on page 22 and 24 respectively.

There is more interesting news and reviews in this issue.  
Read and be informed.

Callan Emery

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# middle east monitor

Update from around the region



Dr Raja Al Gurg presents Dr Azad Moopen with the Al Jalila Foundation Key of Hope

## Aster DM Healthcare donates AED10 million to Al Jalila Foundation

Al Jalila Foundation has received a donation of AED 10 million from Aster DM Healthcare, one of the leading healthcare conglomerates in the Middle East and India. The donation will help Al Jalila Foundation develop cutting-edge medical research to benefit the future health of the UAE.

Dr Raja Easa Al Gurg, Chairperson of the Board of Directors and Member of the Board of Trustees at Al Jalila Foundation, said: “For many years, Dr Moopen has had a significant influence on the UAE’s medical landscape, building a business while also giving back to society. I would like to take this opportunity to personally congratulate Dr Moopen for making such a positive difference to the UAE. We share a vision – to see our children grow up in a future devoid of cancer, cardiovascular disease, diabetes, obesity or mental illness. The Al Jalila Foundation’s medical research endowment fund provides the basis for such a future and we thank Dr Moopen and Aster DM Healthcare for this major contribution to support the advancement of medical research in the UAE.”

Dr Azad Moopen, Chairman and Managing Director of Aster DM Healthcare said: “We are extremely proud to be able to support the incredible work of Al Jalila Foundation. They are giving the next generation of medical professionals the opportunity to explore the medical sciences and discover solutions that will drastically improve the healthcare industry in the region. Aster DM Healthcare is honoured to be a part of Al Jalila Foundation’s sci-

entific & philanthropic initiative in the area of healthcare to fulfil the vision of H H Sheikh Mohamed Bin Rashid Al Maktoum, Vice President & Prime Minister of UAE and Ruler of Dubai.”

### Al Jalila Foundation to provide cochlear implants

Al Jalila Foundation, the global philanthropic organisation dedicated to transforming lives through medical education and research, has announced a new programme, Ana Asma’a (‘I hear’ in Arabic). Ana Asma’a is part of A’awen, Al Jalila Foundation’s treatment support programme, which will provide children in the UAE who suffer severe hearing loss with cutting-edge cochlear implants to restore hearing.

According to the World Health Organization, hearing impairment affects 360 million people globally (or 5% of the world’s population) and 32 million children under the age of 15. In the Middle East, hearing loss is one of the region’s top five health problems, estimated to affect 1 in 25 people. The condition mostly affects children from birth; other cases are a result of infections, injury or even from excessive noise. Studies show that loss of hearing has devastating consequences for interpersonal communication, psychosocial well-being, quality of life and economic independence; and early intervention is integral for the best chance of recovery.

The cochlear implant technology helps restore hearing using an electronic medical device implant that does the work of damaged

parts of the inner ear (cochlea) to provide sound signals to the brain. The procedure is highly effective with young children as the early stages of brain development maximise the child’s ability to develop speech, language and listening skills, ultimately providing a greater chance of a normal life.

Dr Abdulkareem Al Olama, CEO of Al Jalila Foundation, commented: “Research has made such life-changing medical procedures possible. Today, cochlear implants can restore hearing and offer recipients an improved quality of life. We work with renowned healthcare partners to provide cutting-edge technologies to address hearing impairments in addition to post-operative medical care which includes rehabilitation and speech therapy.”

He added: “Through Ana Asma’a we are helping parents give their children the opportunity to undergo the latest medical procedures offering them renewed hope for their child’s future. We consider it an enormous privilege to be able to give children in the UAE the gift of hearing.”

### AUBMC receives Grand Challenges Explorations grant for research

The American University of Beirut Medical Center and Faculty of Medicine is a Grand Challenges Explorations (GCE) winner, an initiative funded by the Bill & Melinda Gates Foundation. Robert Habib, PhD of the Department of Internal Medicine at the American University of Beirut (Beirut, Lebanon) was awarded a Phase I GCE grant and will pursue an innovative global health and development research project, titled “Use of Physiologic Signal Complexity and Correlation Properties to Quantify Brain Development in Infants.”

Grand Challenges Explorations (GCE) funds individuals worldwide to explore ideas that can break the mold in how we solve persistent global health and development challenges. Dr Habib’s project is one of more than 50 Grand Challenges Explorations Round 14 grants announced by the Bill & Melinda Gates Foundation from over 1,700 applications.

To receive funding, Dr Robert Habib and other Grand Challenges Explorations



winner demonstrated in a two-page online application a bold idea in one of five critical global health and development topic areas that included development of the new ways to measure foetal and infant brain development.

“We are so happy with this news,” said Dr Habib. “The grant research will help us in exploring a novel, practical and indirect approach to quantify the extent of brain development of premature babies compared to healthy full term babies.”

Infants born prematurely will frequently suffer from brain development problems that may affect them in many ways and for the rest of their lives. Early intervention aimed at aiding the brain development in such infants may help reduce the long-term adverse effects. Yet, it is currently difficult, cumbersome, impractical and expensive to assess and quantify brain development in the very challenging infant population, explained Dr Habib.

The proposed research will be based on the concepts that heart and breathing rhythms, or patterns such as how fast and how deep, are ultimately controlled by the brain or central nervous system. Hence, it is reasoned that these patterns will be analyzed mathematically and the results will be different in premature (abnormal) versus full term (normal) babies.

The Principal Investigator will conduct the needed experimentation and analyses to address the above aims. If successful, this research will then provide a solid foundation for a larger systematic set of experiments under a Phase II Gates foundation grant. Such a grant would aim to further develop the novel approach such that it may be used with ease and anywhere needed from the hospital intensive care unit, to doctor clinics to the infant’s own home.

**Moorfields, Dubai Medical College sign MoU for ophthalmology training**

Dubai Medical College and Moorfields Eye Hospital Dubai (Moorfields) have agreed to collaborate in providing undergraduate students with training in Ophthalmology in accordance with the curriculum accredited for undergraduate medical education



Haj Saeed Ahmed Lootah, founder and Chairman of Dubai Medical College, and Mariano Gonzalez, Managing Director, Moorfields Eye Hospital Dubai, sign MoU.

by the General Medical Council, UK. The training will commence in September 2015 for the final year students pursuing MBBCh degree at Dubai Medical College.

The Memorandum of Understanding was signed by the founder and Chairman of Dubai Medical College, Haj Saeed Ahmed Lootah and Mariano Gonzalez, Managing Director, Moorfields Eye Hospital Dubai.

Professor Mohammed Galal El Din Ahmed said: “At Dubai Medical College we believe in collaboration for learning. Such collaborative ventures will help us enrich the curriculum by integrating specialized fields with the primary health care concept.”

Gonzalez, Managing Director of Moorfields Eye Hospital Dubai, added: “Moorfields’ mission in the Middle East includes providing world class treatment and care for patients but also teaching and research. This agreement with the prestigious Dubai Medical College will help us fulfil our mission and enable us to locally support female ophthalmology students in Dubai with undergraduate training to meet international standards.”

**DHCC implements new health insurance law**

Dubai Healthcare City Authority has released details on the implementation of the health insurance law within Dubai Healthcare City.

In June, workshops were conducted on the new Resolution No (8) of 2015 of the health insurance law, and its impact on existing and new healthcare facilities in Dubai Healthcare City.

As per the Resolution, which was announced in May, Dubai Healthcare City Authority is solely authorized to register healthcare facilities; to approve prices for healthcare services; and to monitor approved prices, among other responsibilities.

“Strengthening regulations is paramount as Dubai Healthcare City rolls out expansion plans and welcomes new business part-

ners,” said Dr Raja Al Gurg, Vice-Chairperson and Executive Director of Dubai Healthcare City Authority. “Medical insurance providers are an important stakeholder in healthcare delivery. The new Resolution will allow a closer dialogue between insurance providers and DHCC-based healthcare facilities to increase patient benefits and improve health outcomes.”

The Authority’s long-term goal is to facilitate maximum healthcare services under medical insurance cover and networks. Additional workshops are planned to formulate a medical insurance pricing model as per best practices.

In phases, the Authority will announce details on the implementation.

“The Resolution does not affect registered healthcare facilities and registered insurance providers in DHCC. These facilities and providers will continue to follow the pricing model in place at the time of registration and/or renewal,” said Dr Ramadan AlBlooshi, Managing Director, Dubai Healthcare City Authority – Regulatory.

The Resolution will have a direct impact on new clinical facilities, and on complaints management and handling. Dr AlBlooshi explained, “Prior to the Resolution, complaints against insurance companies were not in our purview. The Authority will handle complaints by three parties – patient, hospital/clinic and insurance providers, and enforce violations.”

**Infant mortality rises in Gaza for first time in 50 years**

The infant mortality rate in Gaza has risen for the first time in five decades, according to an UNRWA study, and UNRWA’s Health Director says the Israeli blockade of Gaza may be contributing to the trend.

Every five years, UNRWA conducts a survey of infant mortality across the region, and the 2013 results were released in August.

The number of babies dying before the

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For more information about our programs and ways to collaborate with the University of Chicago Medicine, please contact:

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age of one has consistently gone down over the past several decades in Gaza, from 127 per 1,000 live births in 1960 to 20.2 in 2008. At the last count, in 2013, it had risen to 22.4 per 1,000 live births.

The rate of neonatal mortality – the number of babies that die before four weeks old – has also increased significantly in Gaza, from 12 per 1,000 live births in 2008 to 20.3 in 2013.

“Infant mortality is one of the best indicators for the health of the community,” said Dr Akihiro Seita, Director of UNRWA’s health program. “It reflects on the mother and child’s health and in the UN Millennium Development Goals it is one of the key indicators.

“The rate had declined quite smoothly over the last decades across the region, including Gaza. So when the 2013 results from Gaza were first uncovered, UNRWA was alarmed by the apparent increase. So we worked with external independent research groups to examine the data, to ensure the increase could be confirmed. That is why it took us so long to release these latest figures,” Dr Seita said.

Such an increase here is unprecedented in Dr Seita’s experience working in the Middle East. “Progress in combatting infant mortality doesn’t usually reverse. This seems to be the first time we have seen an increase like this,” Dr Seita said. “The only other examples I can think of are in some African countries which experienced HIV epidemics.”

The UN Agency will carry out another region-wide survey of Palestinian refugees in 2018. However, UNRWA will conduct one this year in Gaza alone because of these latest figures.

“It is hard to know the exact causes behind the increase in both neonatal and infant mortality rates, but I fear it is part of a wider trend. We are very concerned about the impact of the long-term [Israeli] blockade on health facilities, supplies of medicines and bringing equipment in to Gaza,” Dr Seita said.

The UNRWA report also highlights that the most recent survey was conducted before last year’s conflict in which over two thousand Palestinians were

killed, the majority of whom were civilians, including more than 550 children.

### **Iraq health services shut down**

A severe funding shortfall has led to the closure of 84% of health programmes supported by humanitarian partners, including the World Health Organization (WHO), in Iraq, leaving almost 3 million people without access to urgently needed health care services.

More than 184 front line health services in 10 governorates have been suspended, leaving millions of refugees, internally displaced persons and host communities without access to trauma care, nutrition supplementation, primary health care, outbreak detection and management, immunization services and reproductive health care services.

“This is a country ravaged by conflict. Not only do we have innocent civilians being caught in the violence, with so many people fleeing the fighting and living in temporary housing, people are at much higher risk from communicable diseases,” said Dr Syed Jaffar Hussain, WHO’s Representative in Iraq. “Unless additional funding is received, millions more will be deprived of health services they urgently need.”

Despite repeated warnings of the imminent closure of health services, and the revision of 2015 plans to focus on meeting the most basic priority health needs for vulnerable populations, funding for health in Iraq remains scarce. Of the US\$ 60.9 million required by Health Cluster, only US\$ 5.1 million – or 8% has been received.

“While we are grateful to donors who have helped us decrease the health impact of this crisis on the people of Iraq, we are far from meeting even the most basic health needs,” said Dr Hussain. “We hope the international community will provide the funds needed to reach 5.6 million of Iraq’s most vulnerable populations with life-saving health services and supplies.

To ensure that halted services are quickly restored, WHO is actively advocating with donors, as well as temporarily utilizing regional resources until additional funding is available.

### **Syrian airstrikes on hospitals kill health workers**

Recent airstrikes on hospitals in Syria’s Idlib province reveal a devastating trend of increased targeting of health facilities in the Syrian war, the international medical humanitarian organization Doctors Without Borders/Médecins Sans Frontières (MSF) warned 14 August, denouncing the attacks and calling on parties to the conflict to respect hospital grounds and civilians.


Airstrikes hit or landed near nine hospitals in Idlib province from August 7 to 10, including three hospitals supported by MSF. Eleven people were killed in the strikes, including three hospital staff members and one patient. At least 31 people were wounded, including seven hospital staff members and six patients.

“These recent attacks are a clear violation of international humanitarian law, which prohibits military attacks on hospitals,” said Sylvain Groulx, MSF head of mission for Syria. “Airstrikes are capable of targeting specific buildings and these hospitals are known locations. They must be respected as neutral spaces where civilians can safely access their right to healthcare services.”

A dialysis centre serving an area with 30,000 people remains closed as a result of the airstrikes, and patients must now travel 70 kilometres, in an insecure environment to access treatment. Services in other hospitals were also affected, including surgery, orthopaedics and physiotherapy. Two ambulances, a generator and a laboratory were destroyed by the strikes, and another three ambulances were damaged.

Similar attacks on civilian infrastructure, including many health facilities, have taken place in recent months in many provinces in Syria.

“Civilians continue to suffer the daily brunt of this war with a massive number of deaths and injuries,” Groulx said.

MSF operates five medical facilities inside Syria and supports more than 100 hospitals and clinics in Syria. It is also working with Syrian refugees who have fled to Iraq, Jordan, and Lebanon. 



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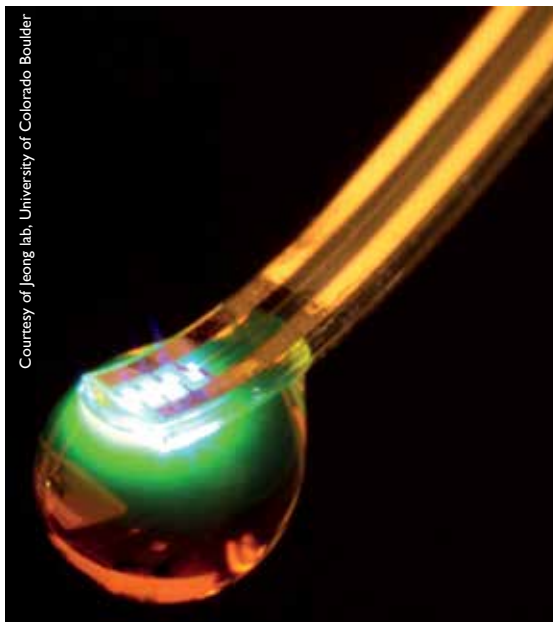
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# the laboratory

Medical research news from around the world



Courtesy of Jeong lab, University of Colorado Boulder

Scientists used soft materials to create a brain implant a tenth the width of a human hair that can wirelessly control neurons with lights and drugs.

## Scientists develop futuristic brain probe allowing for wireless control of neurons

Researchers at the Washington University School of Medicine, St. Louis, and University of Illinois, Urbana-Champaign, created a remote controlled, next-generation tissue implant that allows neuroscientists to inject drugs and shine lights on neurons deep inside the brains of mice. The revolutionary device is described online in the journal *Cell*.

“It unplugs a world of possibilities for scientists to learn how brain circuits work in a more natural setting,” said Michael R. Bruchas, Ph.D., associate professor of anesthesiology and neurobiology at Washington University School of Medicine and a senior author of the study.

The Bruchas lab studies circuits that control a variety of disorders including stress, depression, addiction, and pain. Typically, scientists who study these circuits have to choose between injecting drugs through bulky metal tubes and delivering lights through fibre optic cables. Both options require surgery that can

damage parts of the brain and introduce experimental conditions that hinder animals’ natural movements.

To address these issues, Jae-Woong Jeong, Ph.D., a bioengineer formerly at the University of Illinois at Urbana-Champaign, worked with Jordan G. McCall, Ph.D., a graduate student in the Bruchas lab, to construct a remote controlled, optofluidic implant. The device is made out of soft materials that are a tenth the diameter of a human hair and can simultaneously deliver drugs and lights.

“We used powerful nano-manufacturing strategies to fabricate an implant that lets us penetrate deep inside the brain with minimal damage,” said John A. Rogers, Ph.D., professor of materials science and engineering, University of Illinois at Urbana-Champaign and a senior author. “Ultra-miniaturized devices like this have tremendous potential for science and medicine.”

With a thickness of 80 micrometres and a width of 500 micrometres, the optofluidic implant is thinner than the metal tubes, or cannulas, scientists typically use to inject drugs. When the scientists compared the implant with a typical cannula they found that the implant damaged and displaced much less brain tissue.

The scientists tested the device’s drug delivery potential by surgically placing it into the brains of mice. In some experiments, they showed that they could precisely map circuits by using the implant to inject viruses that label cells with genetic dyes. In other experiments, they made mice walk in circles by injecting a drug that mimics morphine into the ventral tegmental area (VTA), a region that controls motivation and addiction.

The researchers also tested the device’s combined light and drug delivery potential when they made mice that have light-sensitive VTA neurons stay on one side

of a cage by commanding the implant to shine laser pulses on the cells. The mice lost the preference when the scientists directed the device to simultaneously inject a drug that blocks neuronal communication. In all of the experiments, the mice were about three feet away from the command antenna.

“This is the kind of revolutionary tool development that neuroscientists need to map out brain circuit activity,” said James Gnatd, Ph.D., program director at the NIH’s National Institute of Neurological Disorders and Stroke (NINDS). “It’s in line with the goals of the NIH’s BRAIN Initiative.”

The researchers fabricated the implant using semi-conductor computer chip manufacturing techniques. It has room for up to four drugs and has four microscale inorganic light-emitting diodes. They installed an expandable material at the bottom of the drug reservoirs to control delivery. When the temperature on an electric heater beneath the reservoir rose then the bottom rapidly expanded and pushed the drug out into the brain.

● doi: 10.1016/j.cell.2015.06.058

## Findings on cell differentiation controls can advance understanding of stem cells

Singapore scientists from A\*STAR’s Genome Institute of Singapore (GIS) have, for the first time, found further evidence of how the differentiation of pluripotent cells is tied to and controlled by the cell cycle clock. This deeper understanding of how cells become differentiated is extremely important when considering therapeutic potentials.

Embryonic stem cells (ESCs) are cells that have not differentiated into specific cell types, and are said to be in a pluripotent state. The cell cycle is divided into four phases: G1, S, G2 and M<sup>[1]</sup>. Previous studies have shown that cell differentiation of ESCs is initiated only in the G1 phase, attributed to G1-specific properties that contribute to lineage specification. The absence of these properties in the other three phases was believed to passively hinder differentiation.



This study, using high-throughput screening, provides the first evidence that during the S and G2 phases, the ESCs are more potent towards maintaining its stemness; that is, they actively resist differentiation.

Additionally, the scientists found that in instances of DNA damage, ESCs do not differentiate, so as to prevent the formation of specialised (differentiated) cells with compromised genomic integrity.

Findings from the study were published July 2015 in *Cell*.

“Many studies have been devoted to looking at what keeps the ESCs in their undifferentiated state. Hence, to address a gap in the understanding of cell differentiation, our team at the GIS decided to focus on what regulates the ESCs’ exit from their pluripotent state,” said lead author of the research, Dr Kevin Gonzales, Post Doctoral Fellow at the Stem Cell and Regenerative Biology at GIS. “Moreover, most functional screens are carried out in mouse ESCs. The only functional screen on human ESCs was published in 2010 from our laboratory at the GIS. This latest study was also performed on human ESCs, making it more clinically relevant than studies using mouse ESCs.”

Co-lead author Research Fellow Dr Liang Hongqing at GIS’ Stem Cell and Regenerative Biology added, “Our research has shifted the current paradigm from a G1-phase centric view in stem cell regulation to a balanced view that different cell cycle phases perform different roles to orchestrate the stem cell fate.”

GIS Executive Director Prof Ng Huck Hui said, “Knowing that the S and G2 phases employ active pathways to prevent differentiation of ESCs, we can propose that, conversely, the absence of these pathways contributes to G1 phase amenability towards differentiation. This is truly an exciting and huge step forward in the study of cell pluripotency to advance fundamental understanding of human stem cells.”

<sup>[1]</sup> Cell cycle stages: (a) G1, first gap phase in preparation for DNA replication (G1); (b) S, DNA replication phase; (c) G2, second gap phase in preparation for cell division;

(d) M, mitosis [cell division] phase.

● doi: 10.1016/j.cell.2015.07.001

### One in four patients with defibrillators experiences boost in heart function over time

In a study which highlights the dynamic nature of cardiac disease and need for ongoing risk assessment, Johns Hopkins-led research of outcomes among 1,200 people with implanted defibrillators shows that within a few years of implantation, one in four experienced improvements in heart function substantial enough to put them over the clinical threshold that qualified them to get a defibrillator in the first place.

A report on the study, published in the 4 August 2015 issue of the *Journal of the American College of Cardiology*, reveals these patients had markedly lower risk of dying and were far less likely to suffer arrhythmia-terminating device shocks, suggesting their hearts had grown less prone to developing lethal rhythms.

All of the patients in the study had received defibrillators because of declining heart function – a condition that puts them at high risk for lethal rhythm disturbances – but none of them had experienced an actual cardiac arrest. Such preemptive defibrillator placement is known as primary prevention and is distinct from implantation of devices in cardiac arrest survivors with a history of dangerous rhythm anomalies, an approach known as secondary prevention.

The investigators attribute the improvement in heart function primarily to the concurrent use of heart failure medications that enhance the heart’s ability to pump and, in a small portion of patients, to the concurrent use of a special pacemaker that synchronizes the contraction of the heart’s chambers. The team says the real surprise was not the fact that patients got better, but rather how many did.

Because the number of rhythm-restoring device shocks never reached zero among those with improved heart function, researchers say arrhythmia risk was not completely eliminated and patients may continue to derive at least some protection from defibrillators even as

their hearts become less susceptible to fatal rhythms. But because defibrillators can also cause serious complications, the risk-benefit ratio does shift substantially in people whose heart function improves dramatically, the researchers say.

“Our results highlight an urgent need to refine the risk-benefit assessment in people repeatedly, over the course of their treatment, and not just at the time of device implantation,” says senior investigator Alan Cheng, M.D., a cardiac electrophysiologist and an associate professor of medicine at the Johns Hopkins University School of Medicine.

“Determining if patients with defibrillators whose hearts get better over time may be better off without the device is just as important as determining who needs a defibrillator in the first place,” he says.

Implanted defibrillators detect and correct arrhythmias that cause cardiac arrest, but they can also misfire, delivering startling, painful, unnecessary and, at times, dangerous shocks. And because placing the device inside the chest is an invasive and complex procedure, the investigators say, there is risk of blood vessel damage and dangerous heart valve infections.

Predicting which patients are most at risk for a cardiac arrest and stand to benefit most from a defibrillator is often tricky and invariably involves some guesswork, researchers add.

Long-standing clinical guidelines from the American College of Cardiology and the American Heart Association call for all people with heart failure whose hearts’ ejection fraction is below 35% to receive a device if they are able to undergo the implantation.

“Heart function below 35 percent is the current standard guiding device placement. But our study shows in one-quarter of people with defibrillators, heart function, over time, goes above that threshold, suggesting that a person’s risk for arrhythmia is not static. Monitoring such fluctuations is essential to optimize the clinical management of these patients,” Cheng says.

For the study, researchers enrolled and followed nearly 1,200 people, ages 18 to

80, who received defibrillators at four heart centres in the United States between 2003 and 2013 and who were followed for an average of five years. A portion of the group, 538 (45%), underwent at least one heart function re-assessment after initial device placement.

The patients' heart function was evaluated by measuring how well their left ventricles propelled blood to the rest of the body. Of the 538 patients, 40% experienced increased left ventricular ejection fraction. In one-quarter of patients, left ventricular performance increased above 35%. These patients had a 33% lower risk of dying and a 30% lower risk of appropriate device shocks, compared with patients whose heart function remained unchanged.

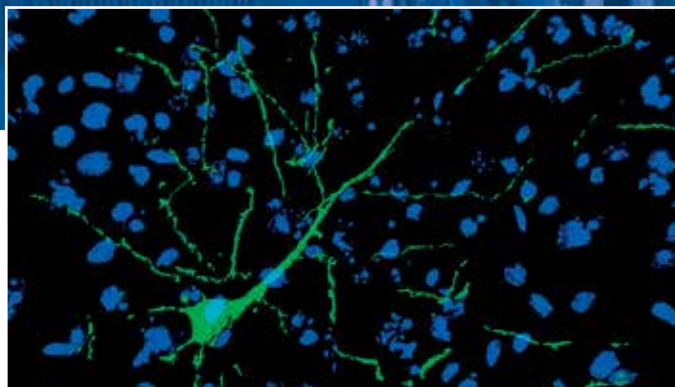
The investigators say the fact that fewer than half of all patients in the study had their heart function re-assessed prior to their regularly scheduled device replacement points to the need for better ongoing monitoring.

● doi: 10.1016/j.jacc.2015.05.057

### Implanted neurons become part of the brain

Scientists at the Luxembourg Centre for Systems Biomedicine (LCSB) of the University of Luxembourg have grafted neurons reprogrammed from skin cells into the brains of mice for the first time with long-term stability. Six months after implantation, the neurons had become fully functionally integrated into the brain. This successful, because lastingly stable, implantation of neurons raises hope for future therapies that will replace sick neurons with healthy ones in the brains of Parkinson's disease patients, for example. The Luxembourg researchers published their results in the August 2015 issue of *Stem Cell Reports*.

The LCSB research group around Professor Dr Jens Schwamborn and Kathrin Hemmer is working continuously to bring cell replacement therapy to maturity as a treatment for neurodegenerative diseases. Sick and dead neurons in the brain can be replaced with new cells. This could one



Part of a brain slice in which a transplanted induced neural stem cell is fully integrated in the neuronal network of the brain (blue) to develop into a complex and functional neuron.

day cure disorders such as Parkinson's disease. The path towards successful therapy in humans, however, is long. "Successes in human therapy are still a long way off, but I am sure successful cell replacement therapies will exist in future. Our research results have taken us a step further in this direction," says stem cell researcher Prof Schwamborn, who heads a group of 15 scientists at LCSB.

In their latest tests, the research group and colleagues from the Max Planck Institute and the University Hospital Münster and the University of Bielefeld succeeded in creating stable nerve tissue in the brain from neurons that had been reprogrammed from skin cells. The stem cell researchers' technique of producing neurons, or more specifically induced neuronal stem cells (iNSC), in a petri dish from the host's own skin cells considerably improves the compatibility of the implanted cells. The treated mice showed no adverse side effects even six months after implantation into the hippocampus and cortex regions of the brain. In fact it was quite the opposite – the implanted neurons were fully integrated into the complex network of the brain. The neurons exhibited normal activity and were connected to the original brain cells via newly formed synapses.

The tests demonstrate that the scientists are continually gaining a better understanding of how to treat such cells in order to successfully replace damaged or dead tissue.

"Building upon the current insights, we will now be looking specifically at the type of neurons that die off in the brain of Parkinson's patients – namely the dopamine-producing neurons," Prof Schwamborn says. In future, implanted neurons could produce the lacking dopamine directly in the patient's brain and transport it to the appropriate sites. This could result in an actual cure, as has so far been impossible. The first trials in mice

are in progress at the LCSB laboratories on the university campus Belval.

● doi: 10.1016/j.stemcr.2014.06.017

### Endoscopes still contaminated after cleaning, study shows

Potentially harmful bacteria can survive on endoscopes used to examine the interior of the digestive tract, despite a multi-step cleaning and disinfecting process, according to a study published in the August issue of the *American Journal of Infection Control*, the official publication of the Association for Professionals in Infection Control and Epidemiology (APIC).

Though endoscopes were cleaned in accordance with multi-society guidelines, viable microbes and residual contamination remained on surfaces after each stage of cleaning, according to study findings.

Researchers from Ofstead & Associates in Saint Paul, Minnesota and Mayo Clinic in Rochester, Minnesota tested samples collected from 60 encounters with 15 colonoscopes and gastroscopes used for gastrointestinal procedures after each reprocessing step to assess contamination levels. Investigators observed all reprocessing activities, using a checklist to ensure that cleaning protocols were performed in accordance with published guidelines.

Reprocessing consisted of: bedside cleaning, manual cleaning in dedicated reprocessing rooms, and automated endoscope reprocessing with a high-level disinfectant. Disinfected endoscopes were stored vertically after drying with isopropyl alcohol and forced air. When contamination levels exceeded pre-determined benchmarks for each cleaning step, technicians went beyond guidelines and repeated cleaning procedures, retesting after each attempt to reduce contamination.

Researchers performed microbial cultures and various rapid tests to detect viable organisms and organic residue that remained after each step of cleaning. Viable organisms were detected on 92% of devices after





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bedside cleaning; 46% after manual cleaning; 64% after high-level disinfection, and 9% after overnight storage. Rapid indicator tests detected contamination above benchmarks on 100% of devices after bedside cleaning; 92% after manual cleaning; 73% after high-level disinfection, and 82% after overnight storage.

“This study demonstrates that colonoscopes and gastroscopes can harbour residual organic material, including viable microbes, even when adherence with recommended reprocessing guidelines is verified,” said the study authors. “More research is needed to identify processes that can ensure all flexible endoscopes are free of residual contamination and viable microbes prior to patient use, including the potential use of routine monitoring with rapid indicators and microbiologic cultures. Results from this study suggest that current standards and practices may not be sufficient for detecting and removing residual contamination.”

The authors list several potential limitations of the study including that it is a single-site study and may not be generalizable. In addition, reprocessing technicians were aware of the researchers’ use of a checklist to ensure guideline compliance and therefore may have devoted more time and effort to reprocessing. Another caveat is that technicians were immediately informed about contamination that exceeded benchmarks and repeated cleaning steps – actions that are not generally part of standard practice.

Colonoscopes and gastroscopes are endoscopic devices with thin tubes, channels, and ports that are used to examine the interior of the colon and the stomach. Recent reports of multidrug-resistant infections related to contaminated duodenoscopes, which have intricate elevator mechanisms and channels that are especially difficult to clean, have raised awareness about the necessity for meticulous reprocessing of all types of endoscopes to prevent the transmission of pathogens to patients.

● doi: 10.1016/j.ajic.2015.03.003

### Researchers show how single genetic mutation increases autism risk

Last December, researchers identified more than 1,000 gene mutations in individuals



with autism, but how these mutations increased risk for autism was unclear. Now, University of North Carolina (UNC) School of Medicine researchers are the first to show how one of these mutations disables a molecular switch in one of these genes and causes autism.

Published 6 August 2015 in the journal *Cell*, the research shows that an enzyme called UBE3A can be switched off when a phosphate molecule is tacked onto UBE3A. In neurons and during normal brain development, this switch can be turned off and on, leading to tight regulation of UBE3A. But a research team led by Mark Zylka, PhD, associate professor of cell biology and physiology, found that an autism-linked mutation destroys this regulatory switch. Destruction of the switch creates an enzyme that cannot be turned off. As a result, UBE3A becomes hyperactive and drives abnormal brain development and autism.

“Genetic studies are showing that there will be about 1,000 genes linked to autism. This means you could mutate any one of them and get the disorder. We found how one of these mutations works,” said Zylka, senior author of the *Cell* paper and member of the UNC Neuroscience Center.

The work was done in human cell lines, as well as mouse models.

Because this one autism-linked UBE3A mutation was part of the Simons Simplex Collection – and Zylka previously had been funded through a Simons Foundation grant – he had access to the cells that were used to find this one mutation. When Jason Yi, PhD, a postdoctoral fellow in Zylka’s lab, sequenced the genes from the cell samples – including cells from the child’s parents – he found that the parents had no hyperactive UBE3A but the child did.

The child’s regulatory switch was broken,

causing UBE3A to be perpetually switched on.

“When this child’s mutation was introduced into an animal model, we saw all these dendritic spines form on the neurons,” said, Zylka, who is also a member of the Carolina Institute for Developmental Disabilities. “We thought this was a big deal because too many dendritic spines have been linked to autism.”

Their findings thus pointed to hyperactivation of UBE3A as the likely cause of this child’s autism.

It was previously thought that too much UBE3A might cause autism because duplication of the 15q chromosome region – which encompasses UBE3A and several other genes – is one of the most commonly seen genetic alterations in people with autism. This is called Dup15q Syndrome.

As part of their study, Zylka and Yi found that protein kinase A (PKA) is the enzyme that tacks the phosphate group onto UBE3A. This finding has therapeutic implications, particularly since drugs exist to control PKA.

“We think it may be possible to tamp down UBE3A in Dup15q patients to restore normal levels of enzyme activity in the brain,” Zylka said. “In fact, we tested known compounds and showed that two of them substantially reduced UBE3A activity in neurons.”

One of the drugs, rolipram, previously had been tested in clinical trials to treat depression but was discontinued due to side effects. One of the symptoms associated with Dup15q syndrome is sudden unexpected death in epilepsy. In light of these life-threatening seizures, Zylka pointed out that it may be worth examining whether lower doses of rolipram, or other drugs that increase PKA activity, provide some symptom relief in Dup15q individuals. “The benefits might outweigh the risks,” he said.

● doi: 10.1016/j.cell.2015.06.045



### Researchers discover endogenous process that controls reproduction of cardiac muscle cells

Heart failure is the most common cause of death worldwide. The main reason for this is that damage to the human heart causes cardiac muscle cells to die, which in turn leads to reduced heart function and death. However, this is not the case for zebrafish or amphibians. If their hearts become damaged and cardiac muscle cells die, their remaining cardiac muscle cells can reproduce, allowing the heart to regenerate. Researchers at Florida Atlantic University (FAU) have now found a possible explanation as to why this does not happen in humans. The results of their research have been published in the journal *eLife*.



The ability of most cardiac muscle cells to reproduce disappears in humans and all other mammals shortly after birth. What remains unclear, however, is how this happens and whether it is possible to restore this ability and therefore to regenerate the heart.

FAU researchers Dr David Zebrowski and Prof. Dr. Felix B. Engel from the Department of Nephropathology at Universitätsklinikum Erlangen's Institute of Pathology and their colleagues have now found a possible explanation for this phenomenon. "In our study we discovered that the centrosome in cardiac muscle cells undergoes a process of disassembly which is completed shortly after birth," Prof. Engel explains. "This disassembly process proceeds by some proteins leaving the centrosome and relocating to the membrane of the cell nucleus in which the DNA is stored. This process causes the centrosome to break down into the two centrioles of which it is composed, and this causes the cell to lose its ability to reproduce."

The centrosome is an organelle found in almost every cell. In recent years, experiments have shown that if the centrosome is not intact, the cell can no longer reproduce. This raised the key question to what extent centrosome integrity could be manipulated – such as in cancer where cells reproduce at an uncontrolled rate.

The FAU researchers have now investigated whether the state of centrosome integrity is regulated naturally in the animal kingdom in order to control the reproduction of certain cells.

"We were incredibly surprised to discover that the centrosome in the cardiac muscle cells of zebrafish and amphibians remains intact into adulthood," says Dr David Zebrowski, who has been studying centrosomes for five years. "For the first time, we have discovered a significant difference between the cardiac muscle cells of mammals and those of zebrafish and amphibians that presents a possible explanation as to why the human heart cannot regenerate."

The discovery that there is a natural process that regu-

lates centrosome integrity in the cardiac muscle cells of mammals opens up a range of possibilities for future research. Firstly, this observation provides a new starting point for attempts to stimulate the reproduction of cardiac muscle cells in humans to regenerate the heart. At the same time, centrosome integrity can be examined in order to find adult cardiac muscle cells that may have retained their ability to reproduce, which may enable new forms of medical treatment. Finally, a detailed understanding of the mechanism could also help researchers to develop methods of inhibiting the uncontrolled growth of cancer cells.

● doi: 10.7554/eLife.05563

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# New vaccine is effective against Ebola in large trial in Guinea

## Massive partnership works in record time to test vaccine and show efficacy and safety

Results on a new vaccine to protect against Ebola indicate a high level of efficacy in a trial of more than 4,000 people in close contact with the deadly virus in Guinea, one of the three West African countries stricken by Ebola. *Middle East Health* reports.

A large and rapidly conducted trial to test a vaccine against Ebola has shown a high level of efficacy according to results published 31 July 2015 in *The Lancet*. The vaccine has the potential to help eradicate the devastating disease that has wracked a number of countries and killed thousands of people in West Africa

The trial results indicate that the new vaccine called VSV-ZEBOV is 100% efficacious in about 10 days after being administered to a person without the infection.

“Having seen the devastating effects of Ebola on communities and even whole countries with my own eyes, I am very encouraged by this news,” said Børge Brende, Minister of Foreign Affairs in Norway.

“This new vaccine, if the results hold up, may be the silver bullet against Ebola, helping to bring the current outbreak to zero and to control future outbreaks of this kind. I would like to thank all partners who have contributed to achieve this sensational result, due to an extra-ordinary and rapid collaborative effort.”

Because of the urgency of the Ebola crisis, clinical development of this vaccine proceeded from initial testing in humans to demonstration of vaccine efficacy and safety in a large Phase III study in Guinea in less than 12 months, a record time.

“Normally, it takes about a decade or more for a vaccine to come to this point,” said Professor Peter Smith, D.Sc., an epidemiologist and specialist in vaccine trials, from the London School of Hygiene & Tropical Medicine and a key advisor.

Because of the Ebola crisis, a massive team was assembled which included scientists, physicians, epidemiologists and experts from the World Health Organization, Norway, Canada, Guinea, Doctors without Borders, Universities of Florida, Maryland and Bern and the London School of Hygiene & Tropical Medicine.

“We knew it was a race against time and that the trial had to be implemented under the most challenging circumstances,” says John-Arne Røttingen, M.D., Ph.D., head of infectious disease control at the Norwegian Institute of Public Health and chair of the trial’s steering group.

Funding came from the Wellcome Trust, Norway, Canada, WHO, Doctors without Borders. MSD (known as Merck in the US and Canada), one of the world’s leading vaccines and pharmaceutical companies, based in Kenilworth, NJ., provided the vaccine. Scientists from the company, along with those from New Link Genetics Corporation, an early developer of the vaccine, also gave detailed technical support to field trial staff on the vaccine and its administration.

“Health workers have been fighting an unfair battle against the Ebola and for the first time there is a prospect of a tool that could protect lives and break chains of transmission,” says Bertrand Draguez, M.D., medical director of Doctors without Borders, the first international organization to treat and follow up Ebola patients in Guinea.

“We view this promising vaccine candidate as a global resource in the fight against Ebola,” says Gregory Taylor, M.D.,

Canada’s Chief Public Health Officer. “It is very encouraging to see the vaccine, which is the product of many years of research and innovation at the Public Health Agency of Canada’s National Microbiology Laboratory, receive positive results in this clinical trial. Having a regulated, safe and effective vaccine that has undergone clinical trials will be an important tool in further containing the current outbreak and providing protection against possible future outbreaks.”

### The vaccine

The Public Health Agency of Canada and New Link Genetics Corporation did the initial research on the vaccine.

MSD licensed the vaccine in November 2014 and assumed responsibility for efforts to research, develop, manufacture and distribute the vaccine, which was tested in the trial.

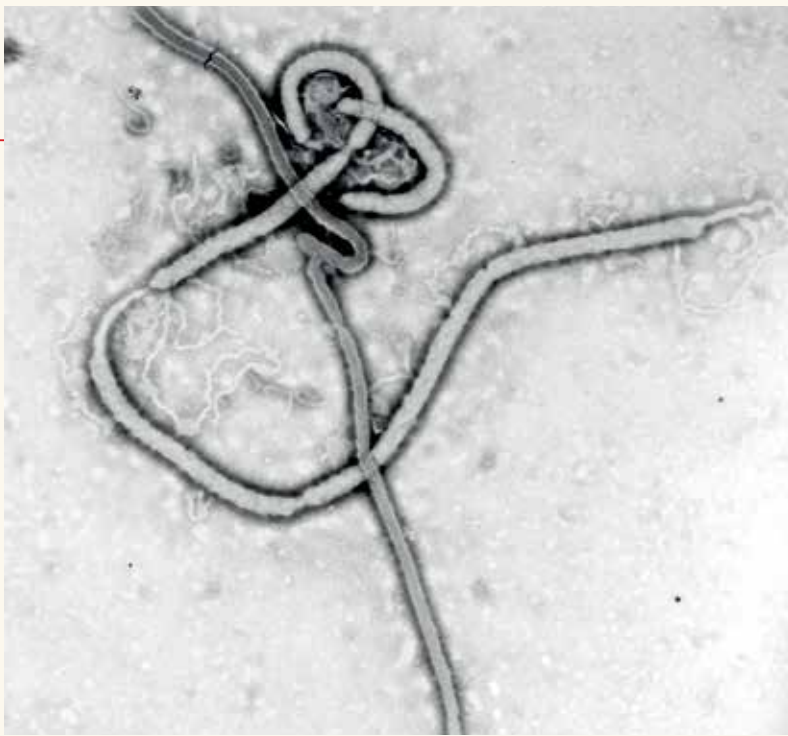
The vaccine combines a gene encoding a key protein of the Zaire strain of the Ebola virus, which ravaged West Africa, and another unrelated virus – VSV.

Combination of these components results in a weakened vaccine virus that cannot cause disease, but that does stimulate the body to generate an immune response.

In this way, the vaccine triggers the production of antibodies to fight off the disease and is made safe.

“The VSV-ZEBOV vaccine works in a similar way to live-attenuated vaccines against other viral infections,” says Mark Feinberg, M.D., Ph.D. of MSD Vaccines.

“The ability of this vaccine to elicit prompt immune responses against the Ebola



The Ebola virus

of Health and their partners in Liberia, and by the US Centers of Disease Control and Prevention and their partners in Sierra Leone.

In September 2014, world-leading experts assembled at the WHO in Geneva, Switzerland. At that meeting, it was decided to prioritize clinical testing of two vaccine candidates. In early October, Norway decided to support vaccine trials in Guinea. On the margins of a high-level vaccine meeting at WHO on October 23rd, a working group for vaccine trials in Guinea was established and a November 5th meeting of this group decided to move forward with the trial based on financial commitments from Norway.

### Ring vaccination strategy

The design of the trial was unique in a number of ways. Firstly, the experts used a ring vaccination strategy, developed to control smallpox from the mid-1960s to its eradication in 1980.

It isolated smallpox patients by vaccinating family members and other close contacts, creating a ring barrier around the disease.

Using the ring approach, when the Ebola epidemic in Guinea had dispersed into smaller local outbreaks, the vaccinators and the trial team were able to move with it. It allowed the trial to continue and at the same time contribute to the control of the Ebola outbreak seamlessly.

The volunteers who received the vaccine came from areas in Guinea that had Ebola outbreaks. These volunteers were directly in contact with those who had contracted the virus or were contacts-of-contacts, such as neighbours, classmates or extended family. In some cases, the clusters were whole villages. In others, the clusters were smaller sections of towns and cities.

Secondly, the experts abandoned the placebo régime used in many clinical trials, because of ethical concerns. The volunteers were still randomized into two groups. The intervention group received the vaccine immediately. The control group received the vaccine three weeks later. This replaced the classical placebo régime, but the trial is still a randomized controlled trial.

The results found that within 10 days the vaccine protected against the Ebola virus for both groups. MEH

virus following administration of a single dose represents an important attribute.”

After VSV-ZEBOV is further studied and licensed by regulatory authorities, MSD plans to produce enough doses to control future outbreaks.

“It will be stockpiled for other Ebola emergencies,” says Dr Feinberg. At this point, the vaccine will not be used like common vaccines such as those for polio and measles, which are routinely administered.

“Ebola is not a common infectious disease, and outbreaks arise in sporadic and unpredictable ways,” says Dr Feinberg.

“So the vaccine will likely be used in at-risk communities where and when it is required. However, it will also hopefully provide an important additional approach to help protect health workers who care for Ebola-infected patients.

“We are doing additional research on the vaccine to provide a comprehensive set of data to inform licensure decisions by regulatory agencies and to facilitate the development and implementation of policy decisions by key international and national authorities,” says Dr Feinberg.

A drawback to the current formulation of the vaccine is that it must be kept very cold in a tropical country with sparse electricity. Future work will be needed to develop a more thermostable formulation.

The outbreak in Liberia, Serra Leone and Guinea was caused by the Ebola strain called Zaire. Other Ebolavirus strains that have been seen in previous outbreaks, such as Sudan, may require the development of new related vaccines.

But the development of such new vaccines has been hugely helped by this study.

### The trial

“This trial dared to use a highly innovative and pragmatic design, which allowed the team in Guinea to assess this vaccine in the middle of an epidemic,” says Professor Jeremy Farrar, M.D., Ph.D., director of the Wellcome Trust and one of the world’s leading experts on infectious disease.

“It is a remarkable result which shows the power of equitable international partnerships and flexibility.

“Our hope is that this vaccine will now help bring this epidemic to an end and be available for the inevitable future Ebola epidemics. This partnership also shows that such critical work is possible in the midst of a terrible epidemic. It should change how the world responds to such emerging infectious disease threats.”

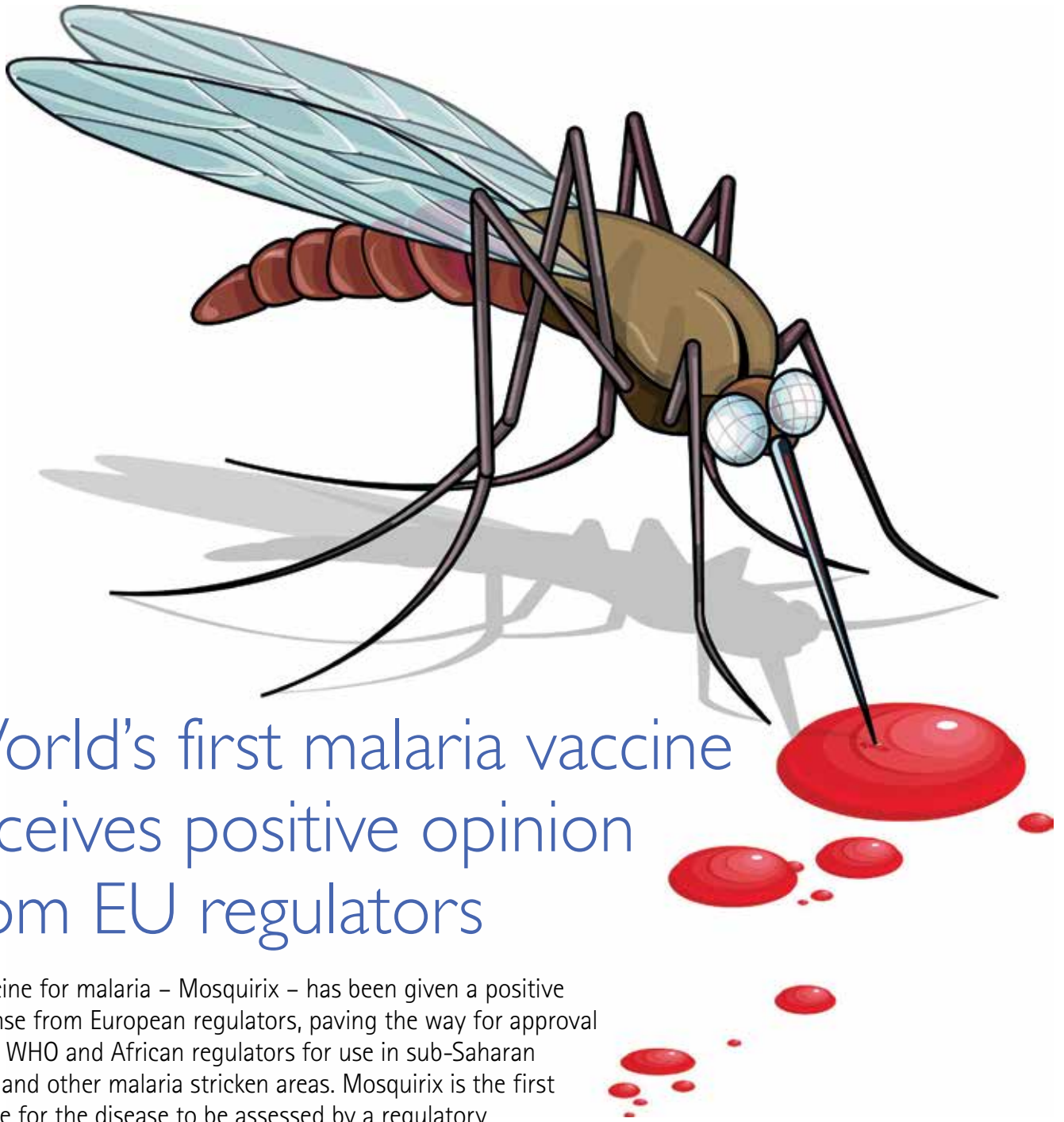
The vaccine had been tested on animals successfully, but not initially on humans. Thus, it was unknown if the vaccine would be well tolerated and stimulate a positive immune response in humans and thereby protect individuals from infection.

“In early human trials, the vaccine had only transitory side effects – such as fever and joint pain – in a few of the individuals who received the vaccine,” says Professor Smith.

“These side effects were generally mild and of a limited duration and are consistent with those seen with a number of other live viral vaccines.”

In a recent review of the available safety data, the WHO’s Global Advisory Committee on Vaccine Safety concluded that the VSV-ZEBOV vaccine has an acceptable safety profile.

In addition to the study in Guinea, the vaccine is being studied in large clinical trials conducted by the US National Institutes



## World's first malaria vaccine receives positive opinion from EU regulators

A vaccine for malaria – Mosquirix – has been given a positive response from European regulators, paving the way for approval by the WHO and African regulators for use in sub-Saharan Africa and other malaria stricken areas. Mosquirix is the first vaccine for the disease to be assessed by a regulatory agency. *Middle East Health* reports.

In a major breakthrough in the battle against malaria, the European Medicines Agency's Committee for Medicinal Products for Human Use (CHMP) has adopted a positive scientific opinion for RTS,S/AS01 (brand name Mosquirix) – a *Plasmodium falciparum* and hepatitis B vaccine – for use outside the European Union.

According to WHO, in 2013 627,000 deaths from malaria were reported globally, of which 562,000 (about 90%)

occurred in the African region mostly among children under the age of 5 years (82%).

RTS,S/AS01 was submitted to EMA under a regulatory procedure (Article 58) that allows EMA to assess the quality, safety and efficacy of a medicine or vaccine and its benefit-risk balance, although it will not be marketed in the EU. This means that EMA can help facilitate access to new medicines for people living outside the EU.

Mosquirix was developed by GSK in partnership with the PATH Malaria Vaccine Initiative (MVI).

The vaccine is intended for use in areas where malaria is regularly found, for the active immunisation of children aged 6 weeks to 17 months against malaria caused by the *Plasmodium falciparum* parasite, and against hepatitis B.

The positive response comes on the back of evidence derived from a large phase III clinical trial programme

involving more than 16,000 young children that was conducted by 13 African research centres in eight African countries (Burkina Faso, Gabon, Ghana, Kenya, Malawi, Mozambique, Nigeria, and Tanzania).

Data from this trial demonstrate that over the first 18 months following three doses of RTS,S, malaria cases were reduced by almost half in children aged 5-17 months at the time of first vaccination and by 27% in infants aged 6-12 weeks. At study end, four doses of RTS,S reduced malaria cases by 39% over four years of follow-up in children, and by 27% over three years of follow-up in infants. In areas of the highest malaria burden, more than 6,000 clinical malaria cases were prevented over the study period for every 1,000 children vaccinated. The efficacy of RTS,S was evaluated in addition to existing malaria control measures, such as insecticide treated bed nets, which were used by approximately 80% of the children and infants in the trial.

Based on the results of the trial the CHMP concluded that despite its limited efficacy, the benefits of Mosquirix outweigh the risks in both age groups studied. The CHMP considered that the benefits of vaccination may be particularly important among children in high-transmission areas in which mortality is very high.

The European Medicines Agency (EMA) now issued what is called “a European scientific opinion”. This is not licensure, but provides a scientific opinion which African regulators may use to help their own regulatory processes.

### Regulatory approval

EMA's opinion was positive indicating that in their assessment the quality of the vaccine and the risk/benefit is favourable from a regulatory perspective. This does not take into account contextual elements such as the feasibility of implementation, the value of the vaccine in the context of other malaria control measures, and the likely cost-effectiveness of the intervention in different settings. The registration of vaccine will be done by African national regulatory authorities that will consider licensing the vaccine in their jurisdictions. African regulators

will consider this when the manufacturer makes a regulatory submission to them, which has not yet occurred.

WHO will convene the Strategic Advisory Group of Experts (SAGE) on Immunization and the Malaria Policy Advisory Committee (MPAC)<sup>3</sup> to review all evidence regarding RTS,S/AS01 efficacy and safety, as well as other relevant data for global policy. SAGE/MPAC will propose recommendations to WHO for the use of RTS,S/AS01 in October 2015. It is planned that WHO will make its official policy position available by the end of November 2015.

RTS,S/AS01 is being considered as a complementary intervention, i.e. any use of RTS,S/AS01 would be in addition to scaled-up access to and use of non-vaccine malaria preventive measures, prompt diagnostic testing and effective anti-malarial medicines.

There are many effective interventions now available that can be used to reduce the burden of malaria in Africa. These include prevention through mosquito vector control using long-lasting insecticidal bed-nets and, in some settings, indoor residual spraying with insecticides; seasonal malaria chemoprevention in some settings; intermittent preventive treatment for infants and during pregnancy; prompt diagnostic testing; and treatment of confirmed cases with effective anti-malarial medicines. These measures have dramatically lowered malaria disease burden in many African settings. The malaria disease burden can be lowered further by continuing to scale up existing WHO-recommended control measures. Available malaria control interventions represent some of the most cost-effective measures for public health.

Sir Andrew Witty, CEO of GSK said: “[The CHMP] scientific opinion represents a further important step towards making available for young children the world's first malaria vaccine. While RTS,S on its own is not the complete answer to malaria, its use alongside those interventions currently available such as bed nets and insecticides, would provide a very meaningful contribution to controlling the impact of malaria on children in those African communities that need it the most. The work doesn't


stop here and GSK remains committed to investing in R&D for malaria vaccines and treatments to find more ways to tackle this devastating disease.”

Dr David C. Kaslow, Vice President of Product Development at PATH said: “[the positive opinion of the CHMP] marks a significant scientific milestone for the long-standing partnership to develop a vaccine, yet several more steps remain before a malaria vaccine might reach the young children in Africa who most need protection against this deadly human parasite. PATH will continue to work with GSK and other partners to ensure that the evidence is available, as soon as possible, to support informed decision-making on those remaining steps.”

GSK has committed to a not-for-profit price for RTS,S so that, if approved, the price of RTS,S would cover the cost of manufacturing the vaccine together with a small return of around five per cent that will be reinvested in research and development for second-generation malaria vaccines, or vaccines against other neglected tropical diseases.

Following the WHO policy recommendation, GSK will also submit an application to the WHO for pre-qualification of RTS,S. WHO pre-qualification involves a scientific assessment of the quality, safety and efficacy of any new vaccine proposed for introduction in WHO Expanded Programme on Immunization. A pre-qualification decision is used by the United Nations agencies and other large scale public procurement agencies to help inform vaccine purchasing decisions.

Once a WHO pre-qualification is granted, GSK would then apply for marketing authorisation in countries in sub-Saharan Africa on a country-by-country basis. These regulatory and policy decisions would, if positive, enable countries to begin implementation of RTS,S through their universal immunisation programmes.

Both a WHO policy recommendation and WHO pre-qualification are requirements for Gavi, the Vaccine Alliance, to support eligible African countries introducing RTS,S into local immunisation programmes supported by UNICEF. 

Village girls in Yemen. More than 15 million people in Yemen are in need of health care, says the WHO.



# ‘Catastrophe’ looms as health facilities close in face of conflict

Nearly a quarter of all health facilities in Yemen are no longer operating fully – with more expected to close down in the coming weeks – resulting in “catastrophic consequences” for patients suffering from chronic kidney failure who are dependent on life-saving support, the World Health Organization warned in August.

“The departure of health professionals fleeing violence has led to shortages of qualified health workers, creating a gap in the provision of primary health care, trauma and surgical care, as well as obstetric care,” WHO said in a statement issued in Sana’a, the Yemeni capital. “Further exacerbating the situation are shortages of power and fuel which have resulted in the closure of intensive care units and operation rooms in almost all hospitals across the country.”

### Vaccination

Against this backdrop, however, WHO announced it has managed to vaccinate more than 3.9 million children under 5 years against polio in a national wide campaign launched on 15 August and an more than 860,000 other children aged 6 month to 15 years against measles in high-risk areas.

“Despite these achievements, we are only touching the tip of the iceberg in terms of our response,” said Dr Ahmed Shadoul, WHO Representative for Yemen. “Millions of people are in urgent need of healthcare services and thousands more could lose their lives – not as a result of the violence, but as a result of limited funding impeding our ability to reach affected populations.”

### Health services

More than 15.2 million people are in need of health services in Yemen, according to the agency, and with 1.4 million on the move, the “massive” population movement has overstretched functioning health facilities in areas hosting the displaced, increasing the risk of vaccine-preventable and waterborne diseases. More than 2.6 million children under 15 years of age are at risk of measles and another 2.5 million under 5 at risk of diarrhoeal disease and acute respiratory infections, WHO said.

“Almost 23% of all health facilities in Yemen are currently non-functional or partially functional as a direct result of ongoing violence, and additional facilities continue to close down week by week,” the agency said.

Most recently, the renal dialysis centre in Haradh governorate was forced to close due to increased violence and insecurity in the area preventing staff and patients from accessing the facility.

“The centre’s closure could have catastrophic consequences for chronic renal failure patients who are dependent on its life-saving support,” according to WHO.

WHO has also trained and deployed over 50 mobile medical teams and 20 fixed medical teams in 11 governorates to provide an integrated primary health care package, and provided fuel to support the operation of 72 health facilities.

To reduce the risk of water-borne diseases, WHO has provided safe drinking water, hygiene supplies and cleaning materials to displaced populations in all affected governorates.

Almost 23% of all health facilities in Yemen are currently non-functional or partially functional as a direct result of ongoing violence, and additional facilities continue to close down week by week.

Out of \$151 million required to meet the health needs of internally displaced persons in Yemen until the end of 2015, only \$23 million has been received, leaving a funding gap of 85%.

“If WHO does not receive much needed funds in the next coming months, more critical health care services will be forced to shut down,” the agency warned.

The top UN humanitarian official told the Security Council in August that the scale of human suffering is nearly incomprehensible, and that unless stakeholders get the parties to stop the fighting and return to the negotiating table, soon “there will be nothing left to fight for”.

“The civilian population is bearing the brunt of the conflict – a shocking four out of five Yemenis require humanitarian assistance and nearly 1.5 million people are internally displaced. More than 1,000 children have been killed or injured and the number of young people recruited or used as fighters is increasing,” Under-Secretary-General for Coordination of Humanitarian Affairs, Stephen O’Brien, told the 15-member body. MEH



# Re-energizing antibiotics in the war against infections

New understanding of how antibiotics are linked to bacterial tolerance could lead to more effective antibiotics

Antibiotics are the mainstay in the treatment of bacterial infections, and together with vaccines, have enabled the near eradication of infectious diseases like tuberculosis, at least in developed countries. However, the overuse of antibiotics has also led to an alarming rise in resistant bacteria that can outsmart antibiotics using different mechanisms. Some pathogenic bacteria are thus becoming almost untreatable, not only in underdeveloped countries but also in modern hospital settings.

While some researchers seek to develop antibiotics with new mechanisms of actions, others are trying to understand how antibiotics function so that they can devise ways to make them work better.

In principle, antibiotics suppress infections either by killing the bacteria, which is called a bactericidal effect or by merely inhibiting their growth, by what is called a bacteriostatic effect. After the treatment has been stopped, growth-inhibited bacteria, however, can re-emerge from their dormancy to start multiplying again with latent infections relapsing back into full-blown attacks.

Now, in a new study, published online 22 June 2015 in the *Proceedings of the National Academy of Sciences*, a team at Harvard's Wyss Institute for Biologically Inspired Engineering led by Wyss Core Faculty member James Collins, Ph.D., pinpoints a critical differentiator that separates the effects of bactericidal and bacteriostatic antibiotics: cellular respiration. This metabolic process uses oxygen under aerobic conditions to convert energy stored in nutrients into ATP, the main energy currency used by all cells.

"It was known for a while that some bactericidal antibiotics put bacterial respiration into over-drive, which, by producing too many oxygen radicals, becomes toxic to the pathogens. We wanted to zero in on these bacterial responses and decided to systematically investigate respiration levels in bacteria treated with a larger spectrum of bactericidal and bacteriostatic antibiotics," said Michael



Lobritz, the study's first author who is a Wyss Institute Clinical Fellow, an instructor at Harvard Medical School, and an infectious disease physician at the Massachusetts General Hospital (MGH).

To begin, Lobritz and his colleagues measured cellular respiration levels in bacterial cultures that were untreated, as well as cultures that were treated with both kinds of antibiotics. The results were clear-cut: in agreement with earlier observations, bactericidal antibiotics generally accelerated respiration activity and produced a toxic overflow in energy production. Surprisingly, however, the team found that bacteriostatic antibiotics worked in quite the opposite way on cellular respiration, they slowed down oxygen consumption and energy production.

Since in clinical practice antibiotics are often administered in combinations to enhance efficacy and the spectrum of targeted pathogens, the team surveyed how combinations of different antibiotics affect cellular respiration. As it turned out, bacteriostatic respiratory outcomes always dominated meaning that the net effect always is a reduction in cellular respiration. As a result, bactericidal effects get eliminated in the mix and the pathogenic bacteria become tolerant.

"Adding bacteriostatic antibiotics to a combination induces bacterial tolerance to the bactericidal treatment. This could help

explain why certain antibiotic therapies do not work. Elucidating the pathways that mediate changes in respiration triggered by specific antibiotics could lead to new potential drug targets that may help achieve the same result in infected patients," said Collins.

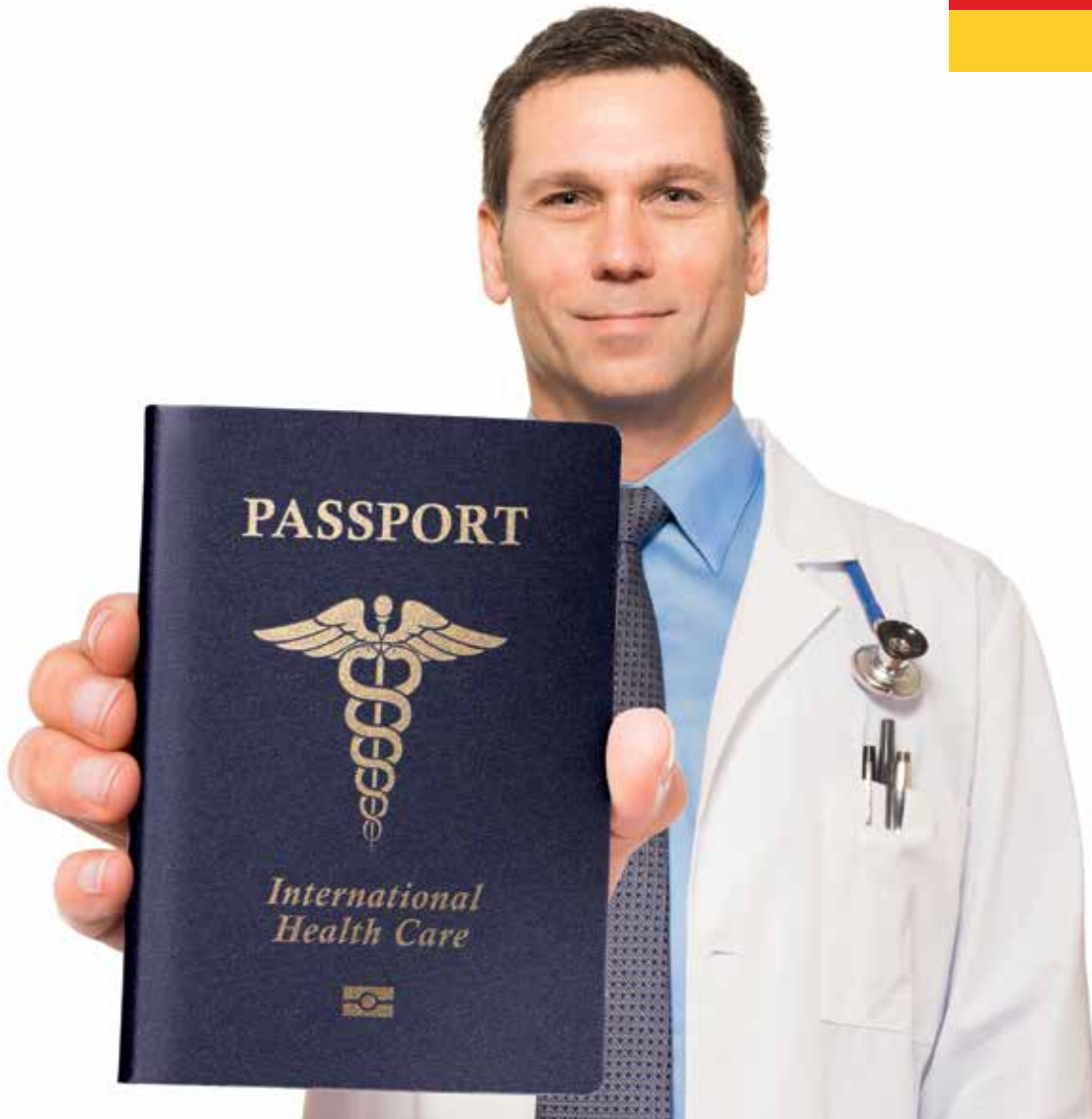
According to Collins, "these findings are only the beginning. They show that better combinations of antibiotics are possible. But ultimately we want to gain deeper insight into the antibiotic modes of action affecting cellular respiration so we can identify better antibiotics to help treat infections." Collins is also the Termeer Professor of Medical Engineering & Science at Massachusetts Institute of Technology (MIT) and a Professor of Biological Engineering at MIT.

"Given the alarming increase in infections caused by multi-drug resistant bacteria, the team's findings provide an entirely new strategy for development of urgently needed therapeutics," said Wyss Institute Founding Director Donald Ingber, M.D., Ph.D., who is also the Judah Folkman Professor of Vascular Biology at Harvard Medical School and Boston Children's Hospital and Professor of Bioengineering at the Harvard John A. Paulson School of Engineering and Applied Sciences.



Antibiotic efficacy is linked to bacterial cellular respiration

[www.pnas.org/content/112/27/8173.full.pdf](http://www.pnas.org/content/112/27/8173.full.pdf)



## Germany's designs on Arab patients



By Renée-Marie Stephano, JD

A middle-aged man sporting a moustache, Bermuda shorts, white socks and sandals steps out of a blue Volkswagen and is waved inside. Sheikh Abdulrahman al

Mutaf looks more like the vacationing banker and marine biologist that he is until his wife, dressed in a black burqa, follows him out of the van.

For the past two decades, the couple from Qatar have been travelling to Elisee Clinic in Bad Godesberg, a town just south of Bonn that has earned a warm reputation among Arab patients seeking medical tourism services. To the sheikh and his wife, accessing a high-level of medical treatment can be a status symbol of sorts, making a trip to Germany for other Middle Easterners like them status quo.

As many as 77,000 foreign patients from 178 countries visit Germany annually for medical care, the government reports. Another 115,000 arrive for ambulatory care. Arab medical tourism patients are particularly fond of German healthcare

including thousands who hail from the United Arab Emirates, Saudi Arabia, Kuwait, Qatar and Oman.

Medical tourism to Germany drives US\$1.35 billion annually into Deutschland coffers. For good reasons, competition for Arab patients has become as fierce as Bundesliga football, enticing more regions – from Bavaria and Hessen to North Rhine Westphalia – to join the fray and potential economic boon.

Some German hospitals – there are some 200 including 30 university-based – have already adapted an international focus that caters to patients from Gulf Cooperative Council nations. Translation services and support, separate prayer rooms and accommodations for travelling relatives, friends and medical personal have made looking after Arabs a prime consideration

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among healthcare providers who seek to capitalize on the medical tourism patient experience.

### Ounce of prevention

In turn, wealthy Arabs, who would traditionally take advantage of well-connected flights to Germany to avoid the blistering summer heat at home, are now scheduling vacations abroad around medical treatment, not only for oncology, neurosurgery and cardiology, but preventative care as well.

Population growth coupled with precarious lifestyle habits have put increasing pressure on Arab states to deliver treatments to nationals and expatriates for chronic disease from a healthcare infrastructure that is already committed to attracting more patients from overseas. Statistics bear out the angst among doctors and government officials in the Middle East and North Africa who fear healthcare expenditures at home will spiral out of control and force more Arabs overseas for medical care unless the alarming trend is addressed.

Consider that Saudi Arabia – the second most-populous GCC nation and home of one of the highest rates of genetic disease in the world – is predicted to grow from 28.4 million to 35.4 million by 2025. What's more, obesity rates in the UAE are twice that of the world average, and almost 20% of the nation's residents suffer from diabetes and are prone to heart attacks a decade earlier than their counterparts in the United States and Europe.

In the meantime, despite government attempts to curb outbound travel for health services, patients from the UAE and across the Gulf region continue to seek treatments in Europe and the United States, where local governments are appropriating millions of dollars to reinvigorate existing facilities and construct venues to make medical tourism an even more appealing proposition. Conferences, including the World Medical Tourism & Global Healthcare Congress, which played host to the Arab Health & Wellness Forum, in Orlando, Florida, have shaped agendas to support the Arab market.

### Heart of Europe

Hoteliers in Germany have also been happy to oblige this emerging Arab population



now synonymous for habitual smoking and obesity by packaging stays with preventive care and lifestyle modification through local medical clinics and doctors. Rocco Forte claims up to 80% of its Middle Eastern guests in Germany are more than likely receiving medical treatment. Some, most probably, through programs administered at each of three hotels, all connected to a local surgeon who has expertise in diabetes, renal and coronary heart disease. Related affiliations are also common at Lans Medicum, a medical center in Hamburg that partners with the Fairmont Hotel Vier Jahreszeiten to examine guests for early stages of cancer, cardiovascular disease and metabolic illness.

Health vices including a new-found appetite for fast-food have pushed non-communicable chronic disease into the health consciousness of Gulf state Arabs. Now, when these patients consider help for their complications in Germany, they can think about lodging that offers Arabic-speaking concierge services, copies of the Holy Qur'an in each room, restaurants that remain open for extended hours during Ramadan and chefs who prepare authentic culinary specialties and halal meals.

History recalls that high-end shopping and preserved landscapes have combined to make Germany a natural treat at any time of year. Nestled in the heart of Europe,

Germany is easily accessible to visitors from across the globe. But, the marriage between medicine and tourism has pushed Germany – 5.8% of the country's population is Muslim – ahead of even France and Britain as the most-visited European destination among Arabs. Middle Eastern guests spent 1.5 million nights in German hotels during 2013, and DZT, the nation's tourism board, expects that figure to climb to 2 million by 2020. Compared to their European counterparts, these guests also tend to stay a bit longer – sometimes weeks at a time.

### Made in Germany

The business of medicine is not lost on Germany, which spent approximately €314.9 billion on healthcare in 2013, an increase of €12.1 billion or 4% from 2012 and 11.3% of the gross domestic product. A focus on Arab consumers is one approach to guarantee a steady stream of patients and a source of revenue for both the healthcare and travel sectors especially considering that revenues from medical tourism account for €1 billion annually.

For its advocacy, the government launched "Health – Made in Germany," a website that offers an overview of the German healthcare industry. The multi-lingual internet portal is, in part, designed to help foreign patients identify appropriate hospitals, technology and health-related



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services that can be used to prepare for a stay when in Germany.

Complimentary regional approaches provide further affirmation. In Munich, where a stretch of Maximilianstrasse lures affluent shoppers and some 120,000 visitors each year from GCC nations, the city's hotels pay homage to Arabic guests – 70% of whom are medical tourists. Some patients need not leave the airport. Connections to Munich International allow for fast and comfortable outpatient procedures at either of two surgery rooms and 13 beds within the terminal. Here, patients can have tests or outpatient surgery and be on their way home in the same day. For more conventional care a short distance from the airport, Schön Klinik Vogtareuth houses 400 beds, 10 primary surgical departments, and rehabilitation and interdisciplinary spine centres.

Other German cities, such as Berlin which gives information in Arabic on the city's official tourism website, are

ambitiously striving to keep pace. Not to be outdone, North Rhine-Westphalia – a region which encompasses Düsseldorf, Cologne and Bonn – houses more than 25,000 beds across 90 clinics and ranks third among German states for attracting Arab medical tourism patients.

A good number of these Arab travellers have ties to nearby Bad Godesberg, where Muslim immigrant families have moved into homes vacated when Germany shifted capitals, two decades ago, from Bonn to Berlin. That's about the same time Sheikh Abudulrahman al Mutaf arrived in town. On this visit, his stroll through Bad Godesberg is noticeably different. The storefronts at the local pharmacy, jewelry store, café and souvenir shop display their wares in Arabic. The good news he hears when he returns to the clinic once his wife's treatment is completed is even easier for him to understand. Doctors tell the sheikh that she is OK to return home. **MEH**

### About the author

**Renée-Marie Stephano, JD**, is president of the Medical Tourism Association, the first membership-based international nonprofit trade organization and think-tank for the medical tourism and healthcare industry. The MTA provides strategic development programs for destinations seeking to create sustainable and attractive programs for foreign direct investment. The MTA provides advisory services to investors interested in the industry and matches these financiers with medical tourism-related projects. [www.MedicalTourismAssociation.com](http://www.MedicalTourismAssociation.com)

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As an industry insider with longstanding experience, Willach offers first-hand knowledge of the wide-ranging requirements for efficient pharmacy logistics in different market environments. With a team of consulting pharmacists, designers and technicians, Willach focusses on selling solutions instead of products in order to achieve a functional design that provides operational efficiency, an improved working environment for pharmacy staff, increased profitability for the pharmacy business and the provision of superior healthcare to patients.

## Local Central Filling

To display Willach's automation competence, an impressive "Local Central Filling" operation has been chosen as an example:

The Dutch Zoetermeer Health Centre Foundation Trust runs four pharmacies. The largest pharmacy is located in the district of Oosterheem, in a modern health care centre built recently. The Local Central Filling Solution follows the hub and spoke concept. As part of this concept, several pharmacies share their own localised central storage facility, which is equipped with a pharmacy robot system. The repeat prescriptions from all four pharmacies are processed centrally in the Oosterheem branch and delivered to the other three branches once a day.

Up to 4,000 packages of stock are delivered daily from the wholesaler each



morning and these packages are scanned by staff and stocked in the CONSYS robots. Having three adjacent robotic dispensers means that three staff can simultaneously stock up to 4,000 packages within just 90 minutes.

The repeat prescriptions from all four pharmacies are entered consecutively, prescription by prescription, ready for automatic batch processing. The packages are picked by the robot from channels and automatically labelled before dispensing. For this purpose, each of the three CONSYS robots has been equipped with its own labelling device: the CONSYS Labelmaster.

The labelled packages are transported via conveyor belts and chutes to plastic containers in which all the packages for one prescription are collected. As soon as a prescription is complete, the container is sent along the roller track to a workstation for the clinical check. Empty containers are placed on a dedicated return track and automatically put back into circulation. This automatic loop ensures the smooth operation of the system while reducing the load off staff, which leaves them free to concentrate on processing the prescriptions. This saves time, stops

interruptions and improves working conditions for staff.

With the fast dispensing speed and the fully automatic labelling of packages the central pharmacy can now process up to 1000 prescriptions per day. Previously this took a lot longer and cost significantly more.

While the repeat prescriptions are being processed in the dispensary, normal everyday business takes place in pharmacy front of store. Any packages required in the pharmacy's front of store are dispensed by the CONSYS robots directly to the sales counter. While this is happening, staff can give customers their full attention and have more time to give advice, meaning the customers have a far better experience, whilst insuring the continued safety and accuracy of dispensing is as expected. Dispensing takes place in seconds, which means that waiting times for customers are noticeably shorter. This makes a real difference during busy periods and again this contributes to a better customer experience.

● The full case study as a video is available at:

[www.willach-pharmacy-solutions.com/en/video](http://www.willach-pharmacy-solutions.com/en/video) 



# The dark side of frequent travel

The modern phenomenon of frequent travel – or hypermobility – can lead to a range of negative psychological, psychosocial and social effects, according to a new study ‘The darker side of hypermobility’.

In the paper, Dr Scott Cohen and Prof Stefan Gossling investigate the glamorisation of hypermobility and the negative consequences which are often overlooked.

In his critical review, Cohen first explores evidence denoting that a high social status is often associated with frequent travel, particularly in more privileged societies in Northern Europe. The amount of miles you’ve travelled, how often you hop on and off a plane, the number of places you’ve lived and iconic places you’ve visited all articulate ‘network capital’ and a higher status in life, especially now we have the platform of social media to display our ‘travelness’ through interactive maps, ‘Selfies’ and ‘check-ins’ for our friends to see and admire.

Cohen explains that the consequences of hypermobility need to be addressed, firstly because it’s becoming increasingly common due to more low-cost travel, therefore affecting more and more people, and secondly it is a significant barrier to behavioural change in our consumption and environmental sustainability.

Cohen explores the following consequences of frequent travel. Physiological: jet lag, deep vein thrombosis and increased exposure to radiation. Psychological: stress, anxiety, travel disorientation, feelings of loneliness and isolation (for both the traveller and the spouse left at home) and identity confusion. Social: the negative impact on spouse and children at home, feeling out of sync with your home community and weakened friendships.

Cohen states that these negative personal and social costs have been silenced by the glamorisation of hypermobility through advertising, social media and other forms of public discourse. He concludes that in order to pursue the de-glamorisation of frequent travel, we need to better understand the discourses that make it fashionable and aspirational. Only then can we ‘break the intricate bonds between high mobility and social capital, and to ultimately change transport behaviour’.



The darker side of hypermobility

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These negative personal and social costs have been silenced by the glamorisation of hypermobility.



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# Refugee crisis deteriorates

The Syrian refugee crisis in Jordan is deteriorating. More aid is desperately needed to help the refugees meet basic needs of shelter, food and healthcare. *Middle East Health* reports.

The Government of Jordan, NGOs and the United Nations continue to call on the International Community for financial assistance as the refugee crisis in Jordan deteriorates. In particular, Jordan's healthcare system has come under enormous strain as the country struggles to provide healthcare to the massive Syrian refugee population who have fled the war in neighbouring Syria

and taken shelter within the Kingdom. According to the UNHCR, as of 28 August, the organisation had registered 629,000 Syrian refugees in Jordan. In May the ICRC estimated there were 680,000 Syrian refugees in the Kingdom with 85% of them living in host communities.

Now in its fifth year, the refugee crisis has affected not only the Syrian refugees but

also their host communities in Jordan. The influx of refugees has overstretched Jordan's infrastructure and public services, increasing the demand on housing, food, energy, water and sanitation.

Abdul Latif Wreikat, Minister of Health, told the *Jordan Times* in July that the cost of providing health services for the Syrians currently in Jordan will reach JD30 million



The Zaatari refugee camp in Jordan

(about US\$42 million) this year: a figure that is likely to expand as more displaced people cross into the Kingdom over the northern border.

In November 2014 the Jordanian government announced that all Syrian refugees, whether registered or not, would have to pay for health care at Ministry of Health facilities.

“We provide all needed health services and medication to Syrians who are currently in Jordan, which puts more pressure on the country’s health system,” Wreikat said.

He said the ministry has vaccinated 25,000 Syrian children at a cost of JD800,000.

He added that many of the Syrians who came to Jordan require care for chronic diseases such as cancer, diabetes, cardiovascular disorders and high blood pressure.

Along with the Jordanian Government there are many NGOs operating in the country in an effort to relieve the plight of the refugees. They include, among many others, Médecins Sans Frontières (MSF),



A street scene in Zaatari refugee camp, Jordan



A Syrian refugee woman hangs laundry in front of her tent in Zaatari camp in Jordan



A Syrian refugee boy sits in front of UNHCR provided tent in Zaatari camp in Jordan

## Do not forget this crisis – WFP

Ertharin Cousin, Executive Director of the United Nations World Food Programme (WFP), concluded a visit to Jordan and Lebanon on 13 August by calling upon the international community to continue supporting Syrian refugees displaced in neighbouring countries and appealing to the world not to forget this crisis.

Major funding shortfalls forced the agency to cut food assistance by up to 50%. During her four-day visit, Cousin met with Syrian refugees and government officials, bringing attention to the plight of millions facing extreme hardship as a result of these cuts.

“I met young Syrians who because of the conflict may never realize their incredible potential. This conflict robs them of their education, their childhoods and their dreams,” said Cousin. “The conflict is pushing families below the poverty line, into desperation.

“For affected populations in Syria and refugees around the region, WFP food assistance provides stability,” she said. “To provide this assistance, we rely on the gen-

erosity of the international community. We simply cannot let them down.”

Since the beginning of the year, WFP has faced critical funding shortages that forced it to reduce the level of the assistance it provides to some 1.5 million Syrian refugees in Jordan, Lebanon, Turkey, Iraq and Egypt.

Families are taking extreme measures to cope with their difficult circumstances, including removing their children from school so that they can work, incurring large debts and cutting back on the nutritional value and quantity of the food they eat.

Cousin acknowledged the heavy burden host countries carry. She visited shops where refugees benefit from WFP’s electronic voucher programme (e-cards). Through its e-cards, WFP supports over half a million Syrian refugees in Jordan and 770,000 in Lebanon. The programme has generated income for host communities by injecting over US\$1.1 billion into the local economies of the five neighbouring countries. The programme has also created thousands of local jobs in the food retail sector.

CARE International, the International Committee of the Red Cross (ICRC) and The International Medical Corps.

As well as living among host communities, many refugees are housed in refugee settlements. The Zaatari refugee settlement alone houses some 80,000 registered refugees, according to the UNHCR. And the Azraq refugee settlement is now home to more than 22,000 Syrians.

Life for more than half a million refugees living outside of camps in Jordan has become increasingly tough. The latest survey found 86% of these people live below the Jordanian poverty line of 68 JOD (about US\$95) per capita per month. Faced with such pressures, increasing numbers are moving to camps from urban areas. With Zaatari at capacity, the number of urban refugees seeking shelter in Jordan's second camp, Azraq, increased fourfold in the first six months of this year with 3,658 people returning there from urban areas, compared to just 738 in the second half of 2014. This trend is driven by increasing vulnerability of urban refugees in Jordan whose savings are depleted after years in exile, and who are unable to find secure legal livelihoods. Those living in Amman, in particular, are trying to survive in one of the most expensive cities in the Middle East. Most have already seen the value of their monthly WFP food vouchers being cut in recent months and now face the prospect of losing them entirely.

#### ICRC support

In an effort to address the humanitarian needs of Syrian refugees in Jordan, the International Committee of the Red Cross has continued providing the newly arriving Syrians, who stay initially at four ICRC-supported transit facilities in the north-eastern border area, with often daily essential assistance, including three cooked meals per day, drinking water, blankets, mattresses, hygiene items and basic medical supplies.

In cooperation with the Jordan Red Crescent Society (JRCS), the ICRC continues to provide monthly cash assistance to Syrian refugees living in host communities, since the refugees gradually use up their savings and other resources.

In Zaatari and Azraq refugee camps, the ICRC provides free international phone calls for thousands of Syrians, so they can restore contact with their families inside Syria and elsewhere.

## Zaatari camp – three years on

Ariane Rummery, UNHCR spokesperson, speaking at press briefing in Geneva on 28 July 2015, said: "The Zaatari camp in Jordan was established on 29 July 2012 amid huge inflows at that time of refugees from Syria. The camp was set up in nine days, and has grown in large stages since. Initially there were problems with electricity for lighting and for refugees to charge their mobile phones – the sole means by which they could keep in touch with families back in Syria and elsewhere.

"Today Zaatari is a sprawling, bustling home to around 80,000 Syrians. Prefabricated shelters including family compounds have largely replaced the lines of tents that were initially there. More than

half the population are children, presenting challenges not just on how to provide schooling and restore abruptly halted educations in Syria, but also in investing for the future. 1 in every 3 children is not attending school. There are also some 9,500 young people in the camp aged between 19-24 who need skills training and, like their older counterparts, need livelihood opportunities too. Some 5.2% of these were at university in Syria but had to drop out due to the conflict, while just 1.6% successfully graduated. More opportunities must be found for this generation and the millions of other refugees around the region in similar predicaments: They are the future of Syria," Rummery said.

## Dramatic increase in Syrian patients wounded by barrel bombs – MSF

At a surgical project in northern Jordan, Médecins Sans Frontières (MSF) reports seeing a huge spike in the number of cases of Syrians wounded by barrel bombs.

Over three days in the last week of June, the MSF Ramtha Emergency Surgical Programme received 34 Syrian wounded, some of whom were stabilized by MSF medical teams and referred to other hospitals. The rest continue to receive surgical and rehabilitative treatment in the facility, where MSF works in close collaboration with the Jordanian Ministry of Health to provide medical care to Syrian patients, less than five kilometres from the Syrian border.

"More than 70% of wounded we receive suffer from blast injuries, and their multiple wounds tell their stories," said Renate Sinke, Project Coordinator of MSF Ramtha Emergency Surgical Programme.

MSF and many other organisations have been calling repeatedly for an end to the bombing of populated areas inside Syria. These calls have had no impact. Patients of all ages continue to

arrive at the MSF facility in large numbers with injuries that they said were caused by barrel bombs dropped by helicopters on residential areas and health structures in south Syria.

There have been reports of health facilities coming under attack in Dara'a governorate in July, which has led to an increasing number of Syrian patients taking the risk of a long, hazardous trip to cross the Jordanian border to seek medical care that has become extremely difficult to receive in their home country.

Dr Muhammad Shoaib, Medical Coordinator of MSF in Jordan, said: "A significant proportion of patients we receive have suffered head injuries and other multiple injuries that cannot be treated inside southern Syria as CT-scans and other treatment options are limited."

Many hospitals inside Syria suffer from limited capacity to deal with complex injuries. They lack the manpower and medical expertise, or lack the necessary equipment due to damage or destruction from bomb attacks.



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In the first half of his year, the ICRC says:

- The Jordanian Royal Medical Services have provided health care to Syrian refugees at four ICRC-supported health posts in Hadalat, Rukban, Bustana and Tal Shehab.

- Through the ICRC-run medical facility at Raba'a Al Sarhan Registration Centre in Mafraq, some 6,450 Syrian refugees received medical screening, some 1,520 of the refugees benefited from clinical services, and around 540 of the Syrians were transferred by ambulance to other health facilities.

- Basic first aid training sessions were held for Syrian refugees in three locations: 37 sessions for 1,145 individuals in Zaatari camp, four sessions for 120 people in Azraq camp and one session for 45 participants in Cyber City camp.

- A course on pre-hospital care and another on first aid and stabilization were held for 52 Syrian health-care providers involved in the management of casualties from the Syrian conflict.

In April CARE International voiced its concern about the deteriorating health situation of Syrian refugees in Jordan and called on the international community to share the burden with the Government of Jordan.

According to an assessment by CARE, Syrian refugees, living outside of camps in Jordan, are increasingly unable to pay for medical treatment and access health services. Since November 2014, Syrian refugees have had to pay fees to use Jordan's public health facilities and have no free health access anymore, as the costs of this service became increasingly unbearable for the Jordanian government.

Some of the findings of CARE's assessment:

- Three out of ten families reported that they could not access health services when needed during the last six months. For most, the reason was that services are too expensive and they could not cover the costs. "Many refugees are telling us that they are rather consulting pharmacies to receive the medication that they think they need to treat their condition, as they cannot afford to go to the doctor. However, often their condition deteriorates afterwards," says Salam Kanaan, CARE country director in Jordan.

- Half of pregnant women do not have money to pay for ante-natal care, and 60% of mothers with newborns could not afford post-natal care, heightening the risk of

health problems for them and their babies. At the same time, the health conditions of Syrian refugees are deteriorating as they face increasingly unhealthy living conditions, for example damp rooms and lack of finances to secure heating in the winter.

- CARE has also found that refugees are expressing a high need for psychosocial and psychological support. "The memories of war, the loss of family members and the constant struggle to survive causes high levels of anxiety. Parents are telling us that their children have forgotten how to speak or are bed-wetting," says Kanaan.

In June CARE International issued a report, "Five Years into Exile", which notes that Syrian refugees in Jordan continue to face immense and increasing challenges leading to grave concerns about their vulnerability and protection. The report points to reduced levels of assistance and access to services, lack of sustainable livelihoods, and complicated registration procedures as factors contributing to deepening hardship for the refugees.

"We are seeing growing evidence that after five years of conflict, an increasing number of Syrian refugees have exhausted their means of subsistence. At least two in three families live in poverty. We fear that without scaling up international assistance, the spiral of deepening poverty will accelerate with lasting impact on both refugees and local communities," says Kanaan.

Strikingly, half of the 1,300 Syrian families interviewed said their overall situation had deteriorated over the last year. Inability to pay rent remains their top concern, with 8 out of 10 families worried about housing; 6 out of 10 lack money to buy enough food, an increased share since last year, as a result of the World Food Programme's reducing food support.

"While the numbers of Syrian refugees coming into Jordan has decreased this year, there is no end to their displacement in sight," Kanaan says. "The protracted nature of this crisis demands that we seek longer term solutions. We must address the need for sustainable livelihoods. We seek solutions that will benefit both refugee and host communities. This requires a stronger international commitment to funding. But we must also see the mutual benefits and opportunities available in opening up some work sectors, or creating less complicated procedures for registration of refugees." MEH

## MSF upgrades hospital in Irbid

MSF have upgraded their healthcare facility in Irbid, northern Jordan, according to a statement issued by the organisation in May. At the facility MSF can now provide complicated deliveries including C-sections and improved neonatal care. The upgrade also included a development in the mental health support program which is reaching out to Syrian mothers and children in refugee communities in the north of Jordan.

Marc Schakal, MSF's Head of Mission in Jordan said: "More than half of the children followed by the MSF mental health team in Irbid have witnessed one or more distress factors – the killing of a loved one, the destruction of a home, physical or psychological abuse. The mothers of these children are also being supported by MSF as they struggle to look after their children, in most cases alone due to the death or absence of the father. We are offering them a range of services – individual therapy, group therapy, dyadic therapy, group support and parental guidance.

"Access to mother and child care, as well as mental health care, is very difficult for Syrian refugees here in Jordan, and we are trying to fill some of this gap which, but more needs to be done," Schakal added.

Since the project started in October 2013, it has provided over 20,991 obstetrics/gynaecology consultations, 18,082 paediatric consultations, 3,089 deliveries and 389 neonatology admissions.

The project has become even more important due to the increased pressure on Jordan's health system and following the Jordanian authorities' announcement in November 2014 that all Syrian refugees, whether registered or not, would have to pay for health care at Ministry of Health facilities.

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Keith Affeld and his wife Colleen are happy to have their life back to normal following Keith's successful spinal surgery at UChicago Medicine.

## Retiree lives pain-free after minimally invasive spine surgery

Most days you can find Keith Affeld working in his yard or tinkering with his 1940 Chevy sedan. Having worked in a steel mill for 43 years, he is no stranger to the rigors of physical labor. At 65, he still mows his own lawn.

"Throughout my career I've done a lot of lifting, turning, twisting, climbing and hammering, never suffering from more than a minor muscular backache," he explained.

However, that all changed in October 2014, when Affeld reached down to pick a weed from his wife's flower garden. "As soon as I pulled that weed I fell forward," he said. "I guess I turned wrong and that was it for my back."

The resulting functional change was dramatic, with Affeld describing "shooting pain down my right leg, no matter what I did". He said it only continued to get worse, eventually requiring use of a wheelchair most of the time. After ordering preliminary imaging tests, his family physician referred him to a local specialist. Adding insult to injury, he was told it would be an eight-week wait before he could be seen for an initial evaluation.

Dismayed by the delay, his wife, Colleen, decided to call on a neurologist she had previously seen at the University of Chicago Medicine, emailing her the information on her husband's initial tests. "She got back with me immediately – on a

Saturday, no less – and provided the names of two spine surgeons who could see Keith the following Monday or Tuesday," she said.

Although UChicago Medicine is a 45-minute drive from their home in Valparaiso, Indiana, the Affelds didn't hesitate to take the first available appointment with orthopaedic spine surgeon Michael Lee, MD.

"We pride ourselves on quick patient access," Lee said, noting that an acute onset of severe right leg pain typically suggests that a nerve is compressed in the lumbar spine. "In Mr Affeld's case, this was caused by severe arthritic changes compressing his nerve, as well as spondylolisthesis." Also



This is essentially the same surgery as the traditional open approach, however it has been proven in scientific literature to reduce bleeding and shorten the length of an average hospital stay.

commonly known as a slipped vertebrae, spondylolisthesis occurs when a vertebra shifts forward over another below.

Suspecting a strong inflammatory component to his pain, Lee initially tried an injection consisting of a steroid and a local anesthetic. When it did nothing to address the pain, he determined that surgery was necessary.

Because Affeld also was a cardiac patient, Lee decided to perform a minimally invasive procedure called a transforaminal lumbar interbody fusion (TLIF). This procedure reduced the risk of blood loss and tissue trauma, improving Affeld's surgical safety profile. Lee performed the surgery through three small incisions, assisted by interoperative X-ray technology.

"This is essentially the same surgery as the traditional open approach, however it has been proven in scientific literature to reduce bleeding and shorten the length of an average hospital stay," Lee explained. In his academic role at UChicago Medicine, he teaches the progressive procedure to other orthopaedic spine surgeons.

Although Affeld still had some pain initially following surgery, which is not uncommon as the nerve recovers, he was astonished to be back on his feet the day after his procedure, walking the hospital hallways with light assistance. At his two-week follow-up visit, "the relief was remarkable", he said, calling it "a miracle for me".

Today, Affeld has resumed all of his old activities, which include traveling in the 1940 Chevy Master DeLuxe to car shows across the country. "I'm doing everything I did before, just using common sense," he said.

Who knows? He may even take up golf again – a pastime he and Colleen can look forward to now that he's enjoying his retirement pain-free. **MEH**



# The role of wrist arthroscopy in wrist sport injuries

Wrist arthroscopy has a wide range of indications. Those indications continue to be extended as the principles of open surgical procedures become adapted to the arthroscope. **Dr Mohamad louay Ezat Jabban** Consultant Orthopaedic Surgeon, Sheikh Khalifa Medical City, looks at some of the new developments and current techniques in the field of wrist arthroscopy in sport medicine.

Wrist arthroscopy was first brought into mainstream orthopaedic surgery in 1986 as an “Instructional Course Lecture” at the American Academy of Orthopedic Surgeons. Since then, it has continued to evolve as an essential diagnostic and therapeutic tool.

## Wrist arthroscopy technique

General or regional anaesthesia is preferred. The patient is supine on the operating table with the shoulder along the edge of the table. A 2.5mm arthroscope is used with a 30° viewing angle. Few portals can be used to introduce the scope or instrument to the joint. Each portal is 3mm long and will close at the end of surgery without any stitches and with minimal scar.

## Sport injuries of the wrist

Sport injuries of the wrist include injuries to the ligaments, bone, cartilage or fibrocartilage. The following are some of the pathologies that can be efficiently diagnosed and treated by using wrist arthroscopy.

## TFCC Lesions

Injury to the triangular fibrocartilage complex (TFCC) is a common cause of ulnar-sided wrist pain. Wrist arthroscopy has become the gold standard in the diagnosis and treatment of these injuries. Using arthroscopy surgeons can assess the tear size and stability, as well as any associated synovitis and chondral or ligament lesions.

These lesions are divided into type 1 (traumatic) and type 2 (degenerative). Treatment can accordingly be debrided or repair. Most of type 1 tears are

managed with arthroscopic debridement; however, a number of suture techniques have been previously described in the literature, with two thirds of patients having good to excellent results. The results of arthroscopic debridement of type 2 degenerative lesions have yielded good to excellent results in 75% of the cases with up to 5 years’ follow-up.

## Distal Radius Fractures

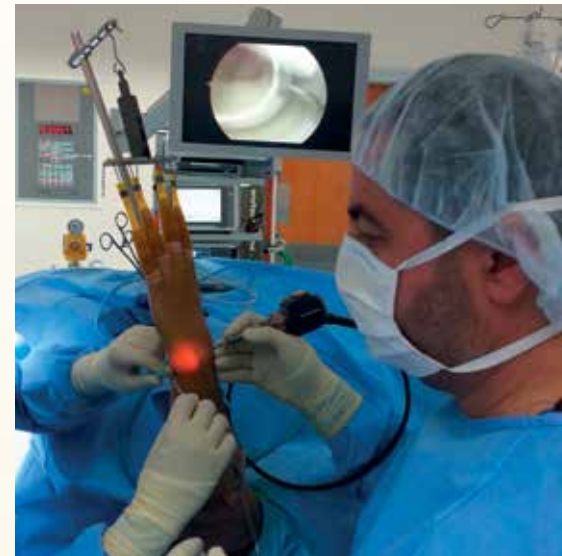
Wrist arthroscopy is now a valuable adjunct in the management of intra-articular distal radius fractures; both in assessing associated intercarpal ligament injury and improving the quality of joint surface reduction.

Patients with arthroscopically assisted reduction of intra-articular distal radial fractures have shown to have superior clinical outcomes, better range of motion, and improved radiologic variables (displacement and angulation), as compared with those undergoing fluoroscopically assisted reduction.

## Assessment of Carpal Instability

Radiologic methods for assessing carpal instability include plain radiography, fluoroscopy, arthrography, computed tomography, and magnetic resonance imaging. Three-compartment arthrography will identify perforations of the intercarpal ligaments, but it does not provide accurate localization of the tears or the extent of instability. Arthroscopy has been shown to be more sensitive than magnetic resonance imaging in diagnosing intercarpal ligament and TFCC injuries.

Arthroscopy is now considered the gold standard for diagnosing carpal instability.



Dr Mohamad louay Ezat Jabban, Consultant Orthopaedic Surgeon, Upper limb and Sport Surgeon, SKMC, performs wrist arthroscopy on a patient.



Open wrist surgery

## Complications

Complications of wrist arthroscopy are uncommon, with authors reporting rates of approximately 2%. The most complications are related to the size of the instrumentation within a small joint space.

## Conclusions

Wrist arthroscopy is a relatively safe procedure that has undergone many advances since it was first described. It is now regarded as the gold standard in the diagnosis and treatment of a variety of conditions. Its clinical applications continue to expand, with more complex reparative, reconstructive, and salvage procedures now being performed. Further advances are likely to occur from adapting open reconstructive procedures into an arthroscopic model. **MEH**

# Advantech introduces AMiS-30i medical cart for general medical applications

Advantech, a leading provider of certified medical computing systems and services, is pleased to announce the latest addition to its AMiS product line – the AMiS-30i medical cart with iPS-M210S power system. Ergonomically designed for stress-free use, the AMiS-30i medical cart provides great flexibility for accessory customization. The cart is also equipped with a LiFePO4 battery and enhanced Internet connectivity. Maintaining the high quality as usual, the AMiS-30i cart offers a more economic and lightweight option ideal for general hospital applications, such as document and EMR management.

## Addressing the needs of medical personnel

To deliver daily patient care, medical personnel must push medical carts between rooms. Advantech's AMiS-30i cart is ergonomically designed and lightweight to ensure high mobility and ease of use. The cart is also equipped with large wheels suitable for various floor surface types, as well as front and rear rubber handles to ensure a comfortable no-slip grip. The dashboard control panel supports electronic height adjustment, enabling personnel to use the cart whether standing or sitting. Furthermore, the 47.1 x 41.3 cm tray top provides users with a large working space for daily operations.

## High flexibility for customization

A key characteristic of the AMiS-30i cart is high flexibility. Additionally, the cart is designed for out-of-the-box functionality and rapid installation. If the OS is pre-loaded, the cart can be setup and ready for use in less than 10 minutes. Innovative DIN rails and the modular system design facilitate the integration of a wide range of accessories. Thus, various modules can be selected to customize the cart according to specific application demands.

## Smarter power management

AMiS-30i is equipped with an embedded



medical-grade iPS-M210S power system for enhanced intelligent power management. Using lithium iron phosphate (LiFePO4) cell technology to deliver energies of 210 Wh via a compact power system, the battery also features a low energy density, rapid recharge time (less than 1.5 hours), and long lifecycle (DOD 80%, 1000 cycles). Moreover, the battery can easily be upgraded from 210 Wh to 420 Wh upon request.


Embedded within the intelligent power system is AMiS\_Link, Advantech's intelligent power management software. AMiS\_Link allows hospitals to remotely monitor and manage the battery status, and configure battery parameter settings, such as a low battery alarm, battery temperature, charge/discharge voltage and cycle times, as well as current and accumulated discharge times. Furthermore, to ensure a safe hospital environment for both medical personnel and patients, the

iPS-M210S power system complies with IEC 60601-1 standards.

## Enhanced internet connectivity

Because medical carts are moved to various locations around a hospital, a stable Wi-Fi connection is essential for maintaining operations. Advantech's AMiS-30i offers enhanced Internet access with the inclusion of two built-in 5-dB antennas for WLAN (WLAN is 802.11a/b/g/n) connectivity.

The superior quality and economical price of Advantech's AMiS-30i cart with iPS-M210S power system make it the ideal choice for general care applications. AMiS-30i has been officially launched in early August 2015.

● For more information regarding AMiS-30i or other Advantech digital healthcare solutions, please visit: [www.advantech.com/digital-healthcare](http://www.advantech.com/digital-healthcare) 

# Behind the scenes in the building of a hospital

The state-of-the-art Dr Sulaiman Al Habib Hospital was recently opened in Dubai Healthcare City. *Middle East Health* looks what went into building this hi-tech digital facility.

Dr Sulaiman Al Habib Hospital opened earlier this year in Dubai Healthcare City. The so-called 'digital hospital' takes advantage of advanced technology in an effort to deliver an optimum patient experience and provide world class health care.

Covering 175,000 square feet, the hospital provides 122,500 square feet of medical facilities including 131 patient rooms, 32 intensive care unit beds and 7 operating theatres.

Speaking about the new facility, Nasser Al Huqbani, President & CEO, Dr Sulaiman Al-Habib Medical Group (HMG), said: "As a leading provider of medical healthcare in the region, Dr Sulaiman Al-Habib Medical Group is proud to operate this cutting-edge Digital Hospital that is home to some of the most innovative digital technology and comprehensive patient centred solutions available in the world. Our technology partner, GE, has once again demonstrated their commitment to supporting us in our ongoing endeavours to offer superior healthcare services to the community."

## Construction

The hospital was constructed by main contractor Shapoorji Pallonji. M.D. Saini, Managing Director and CEO, Shapoorji Pallonji, discussed some of the challenges involved with the project.

"Coordinating the construction of any building within an existing community brings several challenges with it. To start with, our working area was limited, meaning a reduction in our storage capacity on site, meaning we had to lease a plot nearby to use as a lay down area. With the plot surrounded by existing roads and being close to a roundabout, we took great care in coordinating the movement of materials to



and from the site to minimise the disruption to the community. Another issue was that of minimising noise pollution. Through strategic planning, we coordinated the works that would cause the least amount of noise to take place from dusk to dawn, ensuring that the ambiance from the site was no more than 50 decibels, in line with the standards set by the DHCC authority.

"The second major challenge we faced was in relation to the ongoing changes in design which is somehow inevitable while constructing such a world class

and unique facility. As a medical facility, with over 2,000 items of biomedical equipment to consider, changes in design have a knock on effect, particular with the electromechanical works. While the various changes caused some amendments to our schedule, by allocating additional resources, we were able to accelerate the progress and make up three months which brought down the total build time."

Working with companies such as General Electric, Schneider, Cloud Solutions Co. and Pro Medic; Dr Sulaiman

Al Habib Hospital has been designed with the digital age in mind. With over 18 smart tech systems installed throughout the hospital, the features include nurse-calling system integrated with wireless telephone system, AVAYA-PABX and smart switches through to sensors that restrict access to visitors or personnel who haven't washed their hands properly.

The medical centre also has a fully robotic angiography suite with a laser-guided imaging system. Other features of the facility include VIP and royal suites.

All patients have access to the 187 clinical and non-clinical departments located on site. The hospital is designed and built to bring the latest innovations to the patient experience – from the moment a patient first enters the hospital through discharge and subsequent follow-up.

According to a statement issued by HMG, the new hospital not only had to complement the existing outpatient clinic in DHCC, but provide an integrated care solution in a way that maximizes the potential of the new technology. The hospital's seamless connectivity with the Group's other facilities also provides timely access to clinical expertise and a competitive range of treatment options across the entire patient care pathway.

## Technology

GE Healthcare was challenged to support the Group's ambitious project. This meant that imaging equipment had to be integrated with IT infrastructure to promote information-sharing across the Group and enhance the management and delivery of patient care, through an innovative patient experience solution.

Having already completed over 11 projects with HMG, GE's local team had a sound base to work from. Nevertheless, HMG's requirements and expectations meant that the GE team leading the project had to bring together a range of new ideas to deliver the right solution. Armed with support from GE's global healthcare expertise, the team developed a range of enhanced and innovative solutions in a number of areas.

## Design Optimization

To maximize the potential of the new Dr Sulaiman Al-Habib Digital Hospital, specifically the Radiology department,

the GE equipment planning team worked closely with HMG's design team to explore options to optimize the layout as well as the patient flow. As a result, over 30 recommendations were considered before HMG finalized the design.

## Equipment Selection

To ensure the new hospital would be competitive with other local private operators, a number of equipment options were considered, which took into account market analyses to establish the optimum technology mix aligned with the planned clinical services. The resulting specification included the latest CT and Cath Lab systems from GE's Discovery, Optima and OEC ranges, as well as cutting-edge wide-bore MR, Digital X-Ray and Ultrasound solutions, all designed to offer a high level of flexibility and image quality combined with low dose technology to benefit patients where possible. Beyond medical imaging, the specification also included GE's latest vital signs monitors and perinatal IT system.

## IT Integration

The effective management of administrative and clinical data while interconnecting multiple HMG clinical sites presented a further but achievable challenge. A comprehensive suite of GE Centricity 360 Healthcare IT applications provided the solution for various hospital departments, including Cardiology, Radiology and Pediatrics, by integrating Diagnostic Imaging, Ultrasound and Life Care Support equipment with HMG's Health Information System (HIS).

## Patient Experience

One of the most challenging tasks for the GE team was to design a Radiology department that enhanced the patient experience. The answer was to take a completely new look at GE's existing evidence-based solution and integrate it with interactive technology and natural materials to create a relaxing and calming environment for the patient.

In the case of the MRI and CT suites, the patient is able to benefit from a further enhanced audio-visual experience selected and managed by the patient themselves. Designed to accommodate the specific

requirements of male and female adults and children, a range of 11 'themes' can be selected by the patient on an iPad before they enter the exam room. Each exam room also includes 'organic' walls, preserved in their natural state to provide a lasting visual experience. During each exam, the patient can experience images on a large screen mounted in the ceiling along with lighting and music designed to put the patient at ease. As an extra personalization, patients can select music from their own media library.


A further enhancement to the overall experience in the MR and CT facilities is the "virtual operator window system". A multiple camera system provides a multi-view patient visual management system replacing the traditional window between the exam room and the technician control room. The benefits of such a system include a perceived improvement in patient privacy and multiple visual angles for better patient management during an exam.

## Benefits

Thanks to the extensive range of equipment installed, the overall HMG facility (comprising the existing outpatient clinic and the new in-patient hospital) is well-suited to provide comprehensive healthcare services to all segments of the community. Outpatients can now be referred quickly and efficiently to the hospital for emergency or ongoing care without referral to another operator.

The exacting standards required by HMG have been the guiding force behind this ambitious project. The Group's mission to provide the highest standard of medical care while improving the quality-of-life of the people it serves, has meant that the most advanced medical technology has been implemented throughout the hospital. Indeed, some of the systems are among the most advanced in the world and the region.

From a hospital management perspective, the hospital now has the potential to benefit from:

- Improved workflow and productivity
- Improved imaging quality
- Best-practice knowledge sharing
- An evidence-based approach to the patient experience
- Improved staff satisfaction 



# Abu Dhabi's newborn screening programme



By Dr A G Shenoy  
MBBS, DCH, MRCPCH (UK).

The Health Authority of Abu Dhabi launched a standardized, integrated and comprehensive Newborn Screening program in March 2010. The program is implemented in both public and private sector medical institutions in the Emirate of Abu Dhabi.

All newborns in the Emirate of Abu Dhabi should receive newborn screening as per the mandate of the Health Authority of Abu Dhabi.

The objective of the program is that each newborn should be screened for certain harmful or potentially fatal disorders that are not otherwise diagnosed at birth. Many

of these disorders are metabolic in nature, which means they interfere with the body's ability to use nutrients to produce energy and maintain healthy tissue. Other types of disorders that may be detected through newborn screening include problems with hormones or blood disorders. These metabolic and other inherited disorders can interfere with an infant's normal physical and mental development in a variety of ways.

Most babies are healthy at birth but the newborn screening test helps medical professionals identify any underlying issues for early treatment and diagnosis.

Early treatment can help prevent the development of serious issues in the future like poor intellectual development or even death.

It is important to note that genetics are not always clear indicators for such issues. A good percentage of genetic disorders occur due to the mutation of genes during pregnancy.

### Newborn screening for the following disorders:

#### Metabolic Disorders

- Phenylketonuria (PKU): A genetic disorder where the baby is born without the ability to breakdown proteins found in food or milk. If not treated soon enough, the baby's intellectual development could be compromised.

- Galactosemia (GALT): A genetic disorder where the newborn infant is born without the ability to breakdown a sugar called galactose, typically found in breast milk and formula. If not treated in time, the disease could affect the baby's brain and/or liver, resulting in poor growth and yellowish skin.

- Biotinidase (BIO): An inherited disorder whereby the baby's body has difficulty processing biotin, one of the B vitamins sometimes referred to as vitamin H. If not treated, the baby could struggle with poor development, poor muscle tone, hearing and vision may also be compromised.

#### Blood Disorders

- Sickle Cell Disease: A genetic disease in which the baby's red blood cells are abnormally formed into crescent shaped cells, as opposed to the typical round shape. This hinders the blood's ability to be absorbed into different parts of the body. If not treated, the baby could face anemia, infection and pain as a result.

- Thalassemia (Hb S/A): A genetic disorder in which the baby's blood cells produces a fewer number of blood cells and hemoglobin. If not treated, the newborn could face anemia, infection, pain and this could eventually hinder their growth.

- Glucose 6-phosphate dehydrogenase

Deficiency (G6PD): A genetic disorder where the baby is born with an inadequate amount of Glucose 6-phosphate dehydrogenase, an enzyme found in red blood cells which protects the cells from being destroyed early. If not detected or treated in time, the infant could face anemia and infection.

#### Endocrine Disorders

- Congenital Hypothyroidism (CH): This occurs when the baby's thyroid does not secrete the necessary amount of thyroid hormones. It can occur because of an anatomic effect in the gland, an inborn error of thyroid metabolism or iodine deficiency. If not treated in time, it could result in poor intellectual development and/or growth deficiencies.

- Congenital Adrenal Hyperplasia (CAH): This is typically an inherited disease in which the baby's adrenal gland does not make enough secrete an adequate amount of hormones. If left untreated, the baby could face growth and sexual development issues in the future.

#### Respiratory Disorders

- Cystic Fibrosis (CF): A genetic

disorder in which mucus builds up in the lungs and gut of the newborn infant. This could result in chest infections and poor growth, if not treated in time.

If test results come up positive for any of the above-mentioned disorders, it does not necessarily mean that the baby will face any health problems. The test was built to detect risk factors to proactively prevent any issues that might arise in the future. More testing and examination are typically required by a specialist to confirm whether a disorder is present and the severity of the case. Early diagnosis is crucial to allow medical professionals to build a preventative treatment plan and stabilize the newborn's health.

The treatment of each condition varies significantly on a case-to-case basis. Treatment could involve change of diet, hormone therapy or medication. If a baby has any one of the conditions screened for in the tests, it is important to begin treatment as soon as possible to avoid future complications.

- For more information, read: "Expanding the comprehensive national neonatal screening programme in the United Arab Emirates from 1995 to 2011".

<http://tinyurl.com/pwnfa8x>

## The Author

**Dr A G Shenoy**, MBBS, DCH, MRCPCH (UK), is a neonatologist specialising in neonatal resuscitation, management of preterm babies, invasive, non-invasive and high frequency ventilation at Medeor 24x7 Hospital.

Medeor 24x7 Hospital is a multi-specialty family hospital located in the heart of Abu Dhabi. The 80-bed hospital offers patients world-class medical care with state-of-the-art facilities and the latest in biomedical technology. The 14-storey hospital, located on Sultan Bin Zayed the First Street, is open to patients 24 hours a day, seven days a week,

to provide healthcare solutions around the clock.

With a team of highly-qualified medical professionals, the hospital provides mother and child care, cardiology, neurology, critical care, musculoskeletal, general and minimally invasive surgeries, endocrinology, rheumatology, dermatology and cosmetology, gastroenterology, physiotherapy, dentistry and ophthalmology services to the residents of Abu Dhabi.

Medeor 24x7 Hospital will be the first of its kind in the private sector of Abu Dhabi to provide a paediatric ambulance and fully equipped neonatal ICU.

## Specialist sleep and respiratory centre opens in Abu Dhabi



Middle East Health speaks to **Ali Hamdani**, MD, Linde Healthcare Middle East and **Dr Imtiaz Khurshid**, Medical Director, Linde Sleep & Respiratory Care Centre, Abu Dhabi.

### Middle East Health: Why set up a sleep centre?

■ **Ali Hamdani:** Our long term idea is to add a varied range of services in the Middle East. Here in the UAE, we have started with a premier sleep clinic – Linde Sleep & Respiratory Care Centre. If you are fatigued, if you are snoring, if you suffer from lack of concentration or if you have a sleeping disorder – Linde Sleep & Respiratory Care Centre cater to patients with these breathing-related sleep disorders.

**Dr Imtiaz Khurshid:** Linde Sleep & Respiratory Care Centre is a premier 9- bed clinic. The Centre was established in order to provide comprehensive care of sleep disorders including diagnosis, treatment, education and long-term/follow up to those affected by this little-understood branch of medicine.

Ali Hamdani: The Centre was opened

earlier this year. It is the only dedicated ‘sleep centre’ in Abu Dhabi and employs American Board of Internal Medicine specified standards of diagnostics and care.

The objective was to bring Linde’s global healthcare expertise and respiratory solutions to the UAE and broader Middle East region. Other offerings in Linde Healthcare’s portfolio include homecare services, long- term ventilation and gas therapies.

### MEH: Who does it cater to?

■ **Dr Imtiaz Khurshid:** Sleep disorders are fairly common in the general population but are more prevalent in those who suffer from obesity, diabetes, hypertension and cardiac problems.

Services include consultation with an American Board certified medical consultant and specialized sleep test

including actigraphy, polysomnography [sleep study], maintenance of wakefulness test and multiple sleep latency test, if needed. In addition we will provide educational and technical support for patients who use CPAP or Bi-level PAP devices. The role of education and management of obstructive sleep apnea is of vital importance and leads to improved CPAP or bi-level PAP compliance.

**Ali Hamdani:** We have seen a good response to our services. Given the lifestyle and demographic dynamics of the UAE, the prevalence of sleep disorders is fairly high. High obesity, stress levels at work and working in shifts are various factors that contribute to this. Corporate organizations, as well as hospitals and clinics, are reacting favourably to our initiative to increase awareness around breathing-related sleep disorders. **MEH**

## Govt endorses initiative to unify medical records

The UAE Cabinet has endorsed an initiative to establish a national unified database of patients’ medical records in the UAE.

The initiative is one of the outcomes of the Cabinet’s Government Innovation Lab, chaired last year in Sir Bani Yas and His Highness Sheikh Mohammed bin Rashid Al Maktoum, Vice President, Prime Minister and Ruler of Dubai.

It aims to unify all medical records of patients in the UAE, facilitate movements of patients among healthcare providers, as well as connect public hospitals and clinics.

Providing up-to-date medical records is a necessity to improve healthcare

services provided in the UAE as it will eliminate duplication of records and reduce registration times, medication errors and length of hospital stay.

It will be implemented in the coming four years.

Sheikh Mohammed said: “Providing healthcare services in the UAE is a joint effort of the federal and local governments as well as the private sector. Improving healthcare services will never stop, as the health of our citizens is our utmost priority.”

He added: “Building a high-quality healthcare system and providing the best services to patients requires that we streamline efforts in this sector. This

initiative will ensure a unified national medical record database to facilitate the healthcare services and provide up-to-date medical data.

“We want healthcare services to reach patients no matter where they are in the country and ensure their health requirements are met. This will help fulfil our aim of enabling our people have a high standard of living.”

Meanwhile, the Cabinet also approved an initiative on a mobile healthcare services programme to provide services in remote areas, especially for senior citizens.

The programme will focus on homecare services and outpatient specialty clinics. **MEH**





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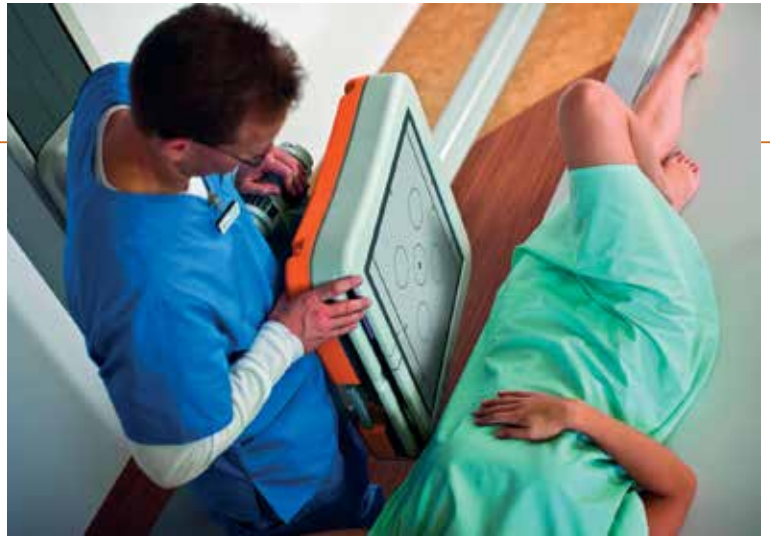
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# Carestream offers major upgrade with new DRX-Evolution Plus



Carestream's new DRX-Evolution Plus has new sleek design with advanced functionality

Carestream Health has released their newest DRX digital imaging system – the Carestream DRX-Evolution Plus. The system offers major software and hardware enhancements to help expedite complex medical imaging exams and support future advanced imaging applications.

Helen Titus, Carestream's Worldwide Marketing Director for X-ray Solutions and Ultrasound, said: "The DRX-Evolution has been embraced by radiology professionals around the world who appreciate its ability to combine ease of use with features that boost productivity and help technologists capture complex exams that previously required greater effort. The DRX-Evolution Plus includes new capabilities to further enhance workflow and offer improved visualization of anatomy."

The DRX-Evolution Plus offers:

- A sleek new design with LED lighting for enhanced functionality and aesthetics
- Greater flexibility in high-ceiling rooms via an extended tube column
- A new high-performance generator
- An optional table to accommodate patients up to 320 kg; and
- Forward-looking design specifications to embrace new advanced imaging applications as they become available.

Additional capabilities of the DRX-Evolution Plus include:

- An innovative wall stand Bucky-angulation feature expedites cross table and other complex X-ray exams
- Tube touch screen allows a technologist to change techniques and view images from the tube
- Paediatric capabilities including automatic technique and image processing for seven paediatric body size categories
- Bone suppression software for optimized viewing of soft tissue

- Fast, secure log-in process using RFID badges
- A transbay option enables fast tube movement across multiple trauma bays, which helps expedite treatment while minimizing movement of critically ill or injured patients
- Automatic acquisition and stitching for long-length and supine imaging exams; and
- IHE Dose Reporting to facilitate data sharing with a facility's dose management system.

Modular components and configurations

The DRX-Evolution Plus offers modular components and configurations. For maximum productivity, the system can be configured with a fixed detector in the wall stand, and one or two additional wireless detectors that can be used for table Bucky and tabletop exams. Like other members of the company's portfolio of DRX systems, the DRX-Evolution Plus enables each DRX detector to work with all other DRX systems within a provider's environment. **MEH**

## New detectors released

Carestream Health announced in late August that the company has introduced its third generation of DRX detectors that are faster and lighter than previous generations and offer a host of features to help users achieve higher productivity and improved image quality. The new CARESTREAM DRX Plus 3543 and DRX Plus 3543C detectors have received FDA 510(k) Clearance and are available in the United States and Europe. Carestream says these detectors will soon be available in other countries as they receive local regulatory approvals.

The new detectors offer higher DQE\* (detective quantum efficiency) to enable improved image quality and lower dose. In addition, the newly designed detectors can be submerged in one meter of water for 30 minutes without failure, which achieves IPX Level 7 rating for liquid resistance and the IEC standard 60529. A reduced weight and thinner profile allows even easier handling.

Other advantages include:

- Fast frame rate provides compatibility with advanced applications in the future
- Tri- and bi-color LEDs offer improved feedback of detector status

- On-detector calibration file storage means quicker setup of the detector on multiple systems

- Faster calibration time, boot time, preview time and full-resolution display time boost workflow; and

- Beam detect mode (for room retrofit applications) eliminates the need for cable connection to the generator. Image capture will automatically start when the detector senses the X-ray exposure.

Battery life has been significantly increased in the new detectors to enable more imaging between battery changes and a battery hot swap now allows a quick battery change without a reboot.

Carestream's DRX Plus 3543 Detector is designed for general radiography imaging while the DRX Plus 3543C cesium iodide detector offers benefits for pediatric and other dose-sensitive applications.

The new generation of DRX Plus detectors continue Carestream's design that enables each DRX detector to work with all other DRX systems within a provider's environment. These detectors also can be inserted into almost any existing X-ray system to deliver enhanced functionality.

# Siemens' Mobilett Mira Max ideal for X-ray at the

Siemens introduced a new digital mobile X-ray system – the Mobilett Mira Max – at the RSNA in Chicago in November last year.

There is a growing demand for mobile x-ray systems because they have a wide range of application – from broken legs to lung examinations, from newborns to trauma patients. With these systems there is no need to transport the patient and examinations can be performed at the bedside in quite small spaces.

Siemens say the proven mobile X-ray system Mobilett Mira is available as a new version with MAX (Multiple Advances in X-ray) functionality. MAX defines functions that support users in their everyday work (MAX assistance) and have a positive effect on image quality (MAX detection).

Because clinical staff frequently have to move mobile X-ray systems around and adjust their position, ease and speed of operation are essential. This is where the advantages of MAX assistance are clear: Since the system is equipped with a special tube arm, it offers nearly unrestricted visibility while being moved. The integrated detector holder

has been designed to enable the operator to manoeuvre the system with convenient foot space. The system comes with a PIN code option to lock and unlock it which makes the need for a physical key redundant. An additional lock function protects patient data against unauthorized access while also preventing the system from being moved unintentionally and X-ray being released.

The buttons on the tube arm allow clinical staff to precisely position the system at the patient's bed. The tube arm can also be rotated 180 degrees, enabling it to be conveniently positioned at the patient's bedside. At about 375 kg, Mobilett Mira Max is one of the lightest devices in the digital mobile X-ray segment.

To ensure that the system can be used at any time, it runs on batteries but can be switched to an external supply. This means that X-ray images can be generated immediately, even if the system batteries are completely empty.



## Image quality

For even higher image quality than previously available, Siemens provides two new detectors for Mobilett Mira Max with the MAX detection function: the extra-compact MAX mini detector measuring 24 cm x 30 cm, which, for example, is ideally suited for examinations in an incubator or of smaller joints. The MAX wi-D detector (35 cm x 43 cm) weighs only three kilograms and is automatically recharged on the system during transportation. It is often used to take lung and chest images in intensive care wards. Combining the latest generation of detectors with 35 kilowatt (kW) of generator power and the proven DiamondView Plus image processing software enables high-resolution images to be generated that are comparable in quality to those of stationary X-ray systems. **MEH**

## New structural features of human hair discovered

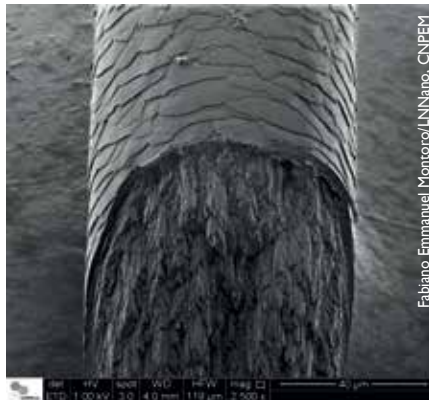
By combining a submicron X-ray beam with cross-section geometry, a team of researchers in Brazil and New York has detected new structural features of human hair – a discovery that is likely to change the way scientists and researchers, as well as the cosmetics industry, view and explore it in the future.

Human hair consists primarily of keratin molecules arranged in a hierarchical sort of structure, in which the fundamental building block is known as an “intermediate filament”.

While studying materials used for hair treatments, Vesna Stanic, a scientist working at the Brazilian Synchrotron Light Source, wondered what effect these treatments were having on the diffraction pattern of the hair. X-ray diffraction patterns of a given material can reveal the local arrangement of molecular and atomic structure.

Although diffraction patterns have been examined and reported in several publications in the past, they involved bundles of hair fibres or microdiffraction on single hair fibres – and, most significantly, the X-ray beam was always oriented perpendicular to the hair fibre axis.

So Stanic decided to take a closer look at the diffraction pattern of the hair by measuring it with an X-ray beam aimed parallel – rather than perpendicular – to the hair axis.



Electron Microscopy micrograph of human hair cross-section. The top region shows the external part of the hair – cuticle region; The bottom region shows the internal macrofibrils – cortex region.

“I wanted to use a submicron X-ray beam, so I asked colleague Kenneth Evans-Lutterodt to perform an experiment on the microdiffraction beamline at Brookhaven National Laboratory,” she added.

Using a submicron X-ray beam and transmission electron microscopy, they were able to spatially resolve the local structure of the three main regions of human hair: medulla, cortex and cuticle.

“We performed a full diffraction map from a 30-micron-thick cross section of hair, with

an incident beam parallel to the hair axis and then compared it to the diffraction map with the beam perpendicular to the hair axis,” noted Stanic.

## What they found

The researchers found an additional, previously unobserved structural region in the cortex near the cuticle boundary. “We also discovered that within the cuticle a key diffraction feature of the alpha keratin is absent – indicating the presence of beta keratin instead of the alpha keratin phase,” said Stanic. Until now, it was believed that keratin in the whole hair had only an alpha conformation, she explained.

The work “provides irrefutable experimental evidence of the hair phase variation across the three main regions of hair and is an important step toward gaining a better understanding of hierarchical ordering of the intermediate filaments of keratin,” she said. “It also highlights the importance of using a submicron X-ray beam to unravel the structures of poorly ordered, multiphase systems such as hair.”

The team believes the cosmetics industry will benefit from their findings. **MEH**



# The Health Industry Summit – Shanghai

The Health Industry Summit 2015 (tHIS), was held in Shanghai, China from 15-18 May. The summit is a major event on the Chinese healthcare industry calendar and attracted more than 210,000 visitors. More than 150 countries participated.

*Middle East Health* attended the event held at the brand new and giant National Convention & Exhibition Center in Shanghai.

The exhibition was organised by Reed Sinopharm, a joint venture between the world's leading event organiser Reed Exhibitions and China's leading state-owned pharmaceutical group Sinopharm. It occupied a total area of 290,000 sqm and provided a platform for the countries medical manufacturers to showcase their products. Several of these larger companies have saturated the enormous Chinese market and have set their sights on the export market.

Well-known healthcare equipment giants like GE, Siemens, Philips, Mindray, and United Imaging had specially designed stands that served as a backdrop for the launch of many new-to-market products.

According to a state-issued strategic white-paper in 2013, China expects the total market size of its health sector to triple to a massive US\$1.2 trillion by 2020. This growth potential in China is partly attributable to its growing ageing population, expected to account for more than 30% of the total by 2050. This coupled with increasing urbanization and the further loosening of the one-child policy will ensure a boom in the birth rate, putting the health system and hospital facilities under increasing strain.

*Middle East Health* spoke to several Chinese companies exhibiting at the event. Following is a selection of some of the interviews.

## Aohua

We spoke to Lu Chen, Sales Manager for International Sales and Marketing for Europe and the Middle East, Aohua.

"Aohua is the leader in the flexible endoscope market in China," Lu explained. "We provide a complete solution – endoscope, accessories, IT systems, cleaning solutions, scope storage systems and after sales service.

"In the next three years we plan to go public on the Shanghai stock exchange," he said. "So the next several years are very important for us.

"The Chinese Government is investing heavily in healthcare by providing various tax breaks for companies in the healthcare sector and introducing a number of healthcare reforms," Lu added.

He said the government was fast-tracking SFDA (the Chinese Food and Drug Administration) certification for various products. "It used to take longer than a year to get a product licensed. This is now down to three to six months."

At the exhibition Aohua launched their new AQ-200 imaging system. It features 1080px Full HD, dual screen, laser communication endoscope and wireless power. It has a built-in workstation and the endoscopic diagnosis report is editable by using the built-in diagnosis administration software. It has digital zooming and its 'endoscope identification' enables the platform to identify the model and series number of the en-



Lu Chen, Sales Manager, Aohua

doscopyes being used.

"The AQ-200 is equal in quality and function to systems manufactured by leading endoscopy companies," said Lu. "However, our strategy is to provide these high quality products at a lower price than our competitors. This means less cost to the distributor so they can make more profit."

"We have set up several service centres abroad as we expand our market around the world. To cater to the Middle East market we have set up a service centre in Istanbul.

"In the Middle East we are working with distributors in Turkey, Saudi Arabia, Iraq, Afghanistan, Jordan, Qatar and the UAE," he said.

"However, with some products we work directly with hospital groups, like King Faisal Hospital in Saudi Arabia. We are able to adapt the equipment to incorporate specific functions that they request."

# MedCaptain

MedCaptain is an integrated solution provider for surgery.

Jie Liu, Chairman and CEO, explained that the company provides equipment for pre-surgery, intra surgery and post-surgery.

“We provide diagnostic solutions for pre-surgery. For intra surgery we provide equipment, such as infusion pumps and syringe pumps which can all be connected to the Hospital Information System. For post-surgery we provide DVT prevention products.

“Our company is new. However, we do export our products. Our market is split 50-50 between the Chinese mar-

ket and the export market, which is largely focussed on Developing Countries, like Brazil, Egypt and Nigeria.”

He said Saudi Arabia is a good market, but it can take a long time to break into it. Lie, a former CEO of Mindray, said that when he was with Mindray, it took 5 or 6 years to open the Saudi market.

“In the Middle East, Turkey is our biggest market. In the Gulf countries we’re just beginning,” he added.

“Our products use the latest technology. We understand what the issues and needs are for pre-, intra and post-surgery and provide a complete solution for this,” he said.

“For example, the touch screen on our



Jie Liu, Chairman and CEO, Medcaptain

pumps requires just three steps to complete a command. They are very intuitive.”

# Mindray

Kewen Xu, International Marketing, Mindray explained that Mindray is like a one-stop-shop for critical care. “We provide patient monitoring systems, life support systems, ECG, anaesthesia machines, ventilators, defibrillators and infusion pumps.”

“We are launching our new SV300 ventilator at the exhibition,” Kewen said. “This is a relatively new product line for us. We launched our first ventilators two years ago – the E3 and E5. This new SV300 is a transport ventilator – to be used as a mobile unit between different departments in a hospital.”

“We try to cover all segments of the market from entry level to premium level. We also try to cover all functional requirements of a hospital,” he explained.

“The SV300 is aimed mostly at the emerging market. It is entry level on price. However, entry level doesn’t mean inferior quality,” he said.

Asked about the Middle East market, Kewen said it was an important market for Mindray. He added that the misguided view in the Middle East that Chinese products were of inferior quality was changing. Certain Chinese brands were now being recognised as quality products.

“The Middle East is a big growth market and there are big profits to be made. But to get into this market you have to first establish your brand. Buyers in this market just want the best. Money is not an issue,” he said.



Kewen Xu, International Marketing, Mindray

However, he added that with the low oil price, some buyers in the Middle East are becoming budget conscious and are selecting equipment in a ‘smarter’ way. “This has enabled us to step into this market.”

He said that Mindray had established a service centre in Riyadh two years ago. “This was a big milestone for us in the Middle East.”

He pointed out that Mindray has very good partners in Saudi Arabia for a number of their product lines.

“Quality is key for us. We will never compromise on quality to provide a better price,” he said.

## Mindray’s new ultrasound DC-8 Exp

Other new products the company launched at the expo included the ultrasound DC-8 Exp. It is based on Mindray’s new generation mQuadro ultrasound platform. It is the industry’s first ultra-

sound system to implement a deep vascular detection solution and offers outstanding processing capabilities featuring Mindray’s proprietary transducer technology and user-defined interface for the practitioner. The system’s new single-crystal technology combined with 3T technology provides a wider bandwidth that gives both better penetration and higher resolution resulting in the best possible scanning solution for difficult patients. The new matrix-array transducer technology uses multiple rows of crystal to help achieve superb resolution of detail throughout the field of view. The unique ‘ART Flow’ technology improves the display of hard-to-detect deep blood flow, and advanced ‘Echo Boost’ technology provides intelligent optimization of images, especially on difficult patients.

# The benefits of insulin pump therapy



**Dr Andreas Reichel MD** discusses the benefits of insulin pump therapy at the 18th Annual Congress of The Lebanese Society of Endocrinology, Diabetes & Lipids.

There are many advantages of insulin pump therapy – the main ones being that it eliminates uncomfortable individual insulin injections and regulates insulin dosage, which is particularly important at night when the diabetic patient is asleep and there is a dip in blood sugar levels.

These key points were made by Dr Andreas Reichel during his presentation to the 18th Annual Congress of The Lebanese Society of Endocrinology, Diabetes & Lipids. The congress was held in Lebanon recently and is considered one of the most important congresses in this field due to the diversity of speakers from around the world. It provides attendees a chance to share knowledge about state-of-art technologies for treating diabetes.

Dr Andreas is Head of the Diabetes Centre at the University Clinic Dresden, Germany and Head of the Dresden Insulin Pump Centre. He is a Specialist in Internal Medicine, Endocrinology and Diabetology. The Dresden Insulin Pump Centre treats about 1,600 patients a year with insulin pump therapy.

Discussing the latest technological developments in insulin pumps, Dr Reichel said that companies are working

on developing pumps where the patient can regulate the amount of insulin he or she needs before eating or doing exercise as well as before going to sleep.

## **Learning how to use the insulin pump**

Dr Reichel said that in order to learn how to use a pump, two days is sufficient to use the pump for the management of diabetes. However, he said it may take a couple of weeks to learn how to adapt the insulin dosage to specific needs and, he added, the patient should regulate the pump for at least the first three months. While doing so, the patient should keep a continuous record and evaluate blood glucose levels.

Most of the patients who benefit from the pump are type 1 diabetics, said Dr Reichel. However, it also assists some type 2 diabetics. He noted that Type 2 patients generally have a very strong insulin resistance which means that the insulin is not able to suppress the glucose production from the liver. This is so particularly in the morning after sleep when the patient needs a very high dose of insulin – and it's not possible to manage that with long acting insulin.

"I have patients who should inject early

Patients using an insulin pump can program it to provide the required dose. This makes them independent and enables them to sleep as long as they want.

in the morning and this is not a good way of life," he said. "These patients can inject long acting insulin before sleeping and again at 4am when the body needs it. However, patients using an insulin pump can program it to provide the required dose. This makes them independent and enables them to sleep as long as they want."

"Whereas, if you have to inject insulin in the morning you can't sleep directly afterwards. It may take you an hour in order to be sure that the insulin is working. By using the pump you can sleep directly afterwards or you can stay sleeping and manage it before you sleep. It's a very comfortable way of taking insulin," he said. **MEH**



# Solar-powered lights designed for emergencies



By **Leslie Morgan**, OBE DL  
CEO, Durbin PLC  
Leslie Morgan is a Fellow of the Royal  
Pharmaceutical Society of Great Britain

The World Bank has announced that it will invest over US\$5.5 billion in the Middle East and Africa on solar energy projects, while \$50 billion will be invested in the Middle East Solar industry. Saudi Arabia is on the brink of becoming a solar energy exporter and is building its first solar powered desalination plant, while Qatar is in discussion with investors to create a major solar power project. All in all, the region is poised on the brink of a 'new age' of solar energy, with distinct growth and interest in this field.

As many of you who regularly read this column will know, Durbin has a division which can respond to the healthcare needs of humanitarian projects, by supplying

equipment and medicine to charities and non-governmental organisations (NGOs). One of the key features of humanitarian disasters, is that often vitally important work needs to be carried out at night, when electricity may be down. These 'off grid' situations are where solar powered lights can really come into their own, which is one of the reasons that Durbin has teamed up with a company who supplies unique forms of solar powered lights. Lucii inflatable solar lights are completely sustainable and were invented in 2012 by an inspiring team, who have first-hand knowledge of disaster relief efforts and who wanted to help stamp out the problem of 'energy poverty' for the world's most needy. Lucii Lights are small, easy to transport and can be utilised during emergencies. An example would be helping users to light up medical facilities for those undergoing medical treatment with safe, reliable and non-polluting light.

MPOWERD, the company behind Lucii lights, was established in 2010 by its founders who wanted to empower people everywhere with affordable, personal, 'clean' energy products. The company leverages its high volume retail sales in the United States to lower costs and sell affordably into developing markets. Lucii lights work well in a range of situations, from emergencies to blackouts. They are waterproof, shatterproof, solar powered and are ideal to light up typical 'off grid' situations. On top of that, they are col-

lapsible and expandable and can last up to 12 hours on bright setting, needing only eight hours of sunlight to recharge.

I am particularly impressed with the company's altruistic 'Give Lucii' campaign, which encourages customers to buy lights to be distributed to the people that need them most by MPOWERD's global NGO partners. By investing in this kind of renewable technology, we can honestly say that we are helping improve lives. So, in short, while there is a worldwide demand for affordable solar lights to replace dirty and dangerous kerosene lamps, Lucii lights are an excellent option. If you would like to find out more about these lights, or have a need for them, please contact Durbin. 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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## A smart chair for seating people with limited mobility

The Smart Seating Revolution Chair is a unique seating aid providing a simple solution to assist healthcare staff or homecare professionals to seat aged care residents at a dining table.

A patented swivel-slide mechanism enables the chair to be positioned away from the table for easy access. The seat rotates to face the table, then carries the user's weight forward to a lockable position at a comfortable distance from the table edge. The chair legs remain fixed at the original place on the floor and are stable at all times.

When the user wishes to exit the chair, a lever on the side of the seat is lifted and the seat glides back from the table. The seat then rotates away from the table, allowing easy exit from the chair.

- No more pushing residents and patients up to the edge of a table



swivel seat



slide forward and back

- Patients and residents can seat themselves without assistance
- Greater independence for users
- Safe: no wheels, supports up to 120kg
- Saves money - no helper's time needed for seating residents for meals

- Reduces compensation claims from staff suffering from injuries when pushing patients

Patent number US 8,899,682 B2

- For more information, visit: [www.revolutionchair.com](http://www.revolutionchair.com)

## Biotronik's BioMonitor2 subcutaneous, insertable cardiac monitor gets CE approval

Biotronik has received CE approval for its BioMonitor2 subcutaneous, insertable cardiac monitor.

BioMonitor 2 is designed for highly accurate and reliable long-term continuous remote monitoring of patients with atrial fibrillation, syncope, bradycardia and tachycardia.

The company released results of a pilot study into the performance of BioMonitor 2 ahead of the 2015 ESC Congress in London.

The pilot study, involving patients in Australia, showed that BioMonitor 2 can provide an insertion time of less than two minutes, high R-Wave amplitudes and a greater than 90 percent success rate for daily 'Biotronik Home Monitoring' transmissions. In addition, the device has a capacity of over 60 minutes of ECG recording time and can transmit up to six sECGs (subcutaneous ECG) daily via Home Monitoring.

"The results of the BioMonitor 2 study confirm the deliverability of the device and the excellent sensing amplitudes afforded by the increased sensing vector



length," commented Dr Sze-Yuan Ooi, Prince of Wales Hospital, Sydney, Australia. "I am hopeful that future trials will show that this translates into improved diagnostic abilities that will aid physicians in the treatment of their patients."

"With BioMonitor 2 to be available on the European market soon, we are pleased to see results indicating that physicians will be able to care for their patients based

on information that is both high quality and reliably transmitted," commented Manuel Ortega, Senior Vice President at Biotronik. "Its accurate sensing and detection, combined with its transmission success and data capacity will provide doctors with more useful information on a patient's condition over time."

- For more information, visit: [www.biotronik.com](http://www.biotronik.com)



## Timesco's Optima Pocket Diagnostic Sets perfect for clinicians

The Timesco Optima Pocket Diagnostic Sets have been designed to offer the clinician and student alike with a perfect diagnostic tool for ophthalmology and aural examination with the convenience of being small enough to be carried in a pocket!

The Timesco Optima Pocket Diagnostic Sets feature the same superb quality optics, precision lenses, fibre optics and Xenon illumination for pure white light and durable materials as Timesco's Desk and Wall mounted Diagnostic sets, Optima Neo.

Individual Ophthalmoscopes and Otosopes as well as a combination of both in diagnostic sets in hard and soft cases are available.

The Optima Pocket Ophthalmoscopes

feature durable construction, superb bright Xenon white light illumination and five apertures: large, small macular (spot), half moon, fixation, red free filter and 18 dioptre lenses.

The Optima Pocket Otoposcopes features high intensity Xenon illumination and fibre optics.

Timesco Optima Pocket Diagnostic Sets are constructed from durable plastics, metal alloys and stainless steels.

Timesco Healthcare Diagnostic Products are ISO, CE and FDA approved and guaranteed for materials and manufacture.

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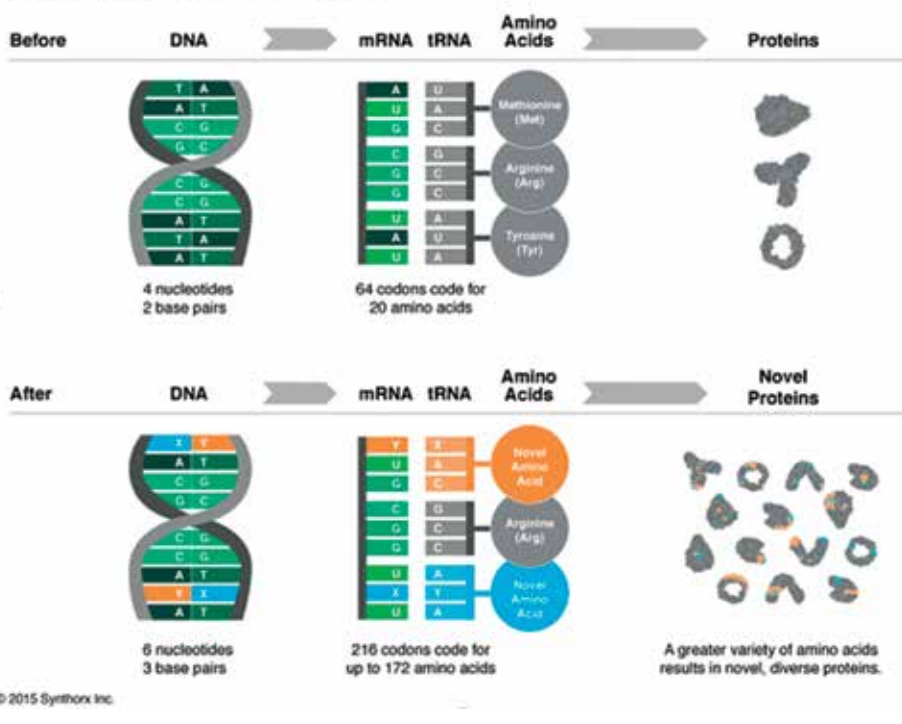
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# Synthorx uses synthetic DNA to make novel proteins

In a major breakthrough in synthetic biology, the California-based biotechnology company Synthorx has managed to create novel proteins using synthetic DNA technology. *Middle East Health* reports.

## Expanded Genetic Alphabet - In Action

By adding a synthetic base pair—nicknamed X and Y—to DNA, the number of possible amino acids a cell can use to construct proteins increases from 20 to 172. This opens new possibilities to add multiple novel amino acids to create novel and diverse proteins for improved enzymes, drugs, diagnostics, and vaccines.



Synthorx announced 18 August they had employed their proprietary protein expression system to successfully produce proteins containing novel amino acids. Using a semi-synthetic DNA template – containing the synthetic base pair X and Y – Synthorx scientists were able to produce RNA containing X and Y, which was used with an otherwise fully natural biological system, to efficiently direct the incorporation of multiple novel amino acids at different sites in proteins.

“Synthorx has achieved a scientific milestone,” said Court Turner, president and co-founder of Synthorx. “By advancing our technology to this stage, we are now poised to produce proteins containing multiple novel amino acids, to fill our drug discovery pipeline as well as enable our partners in many aspects of drug development and manufacturing.”

The work builds on research published in *Nature* last year that described the first *in vivo* replication of DNA containing a synthetic base pair, named d5SICSTP and dNaMTP (abbreviated X and Y). The incorporation of X and Y into DNA expands the genetic alphabet and promises to allow for site-specific incorporation of multiple, different novel amino acids into a single protein. Since the publication, Synthorx has developed and validated a protein expression system, employing its synthetic DNA technology to incorporate novel amino acids to create new full-length and

functional proteins.

“The Synthorx system uses a fully natural cellular system and allows for site-specific insertion of multiple novel amino acids to create more diverse proteins with a range of properties,” added Turner. “We have now shown that our synthetic base pair, X and Y, can not only be replicated *in vivo* but are also compatible with the natural biological machinery to enable novel protein expression.”

DNA from every known species has the ability to code for or “spell” proteins that are assembled from 20 natural amino acids, based on arrangements of its four chemical bases or letters – A, T, G and C. But the DNA that Synthorx makes containing its synthetic bases, X and Y, has the potential to spell with an additional 152 novel amino acids, which could be combined to make proteins with unique properties.

“Hundreds of novel amino acids have been produced in the lab, but incorporating them into a protein in a useful and scalable manner requires an expanded genetic code,” explained Turner. “With our synthetic base pair, we can add multiple different, novel amino acids at any location into a single protein. Now we can create more diverse proteins for improved drugs, diagnostics, and vaccines.”

In the current work, Synthorx scientists site-specifically added novel amino acids into a regular protein. To do this, they customized the DNA that encoded for the

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protein by adding the synthetic base pair at specific locations. Using the Synthorx expression system, the DNA was then transcribed into messenger RNA, which was then translated into a protein of several hundred regular amino acids and one or more novel amino acids. The accurate incorporation of the novel amino acids at the intended locations was confirmed with mass spectrometry.

“When I began working on synthetic bases more than 15 years ago, the end goal was always to be able to incorporate novel amino acids into proteins in a robust manner,” said Floyd Romesberg, Ph.D., Synthorx’s co-founder and professor at The Scripps Research Institute. “With the ability to generate novel and diverse proteins, we have a significant opportunity to make a revolutionary leap forward in improving health by creating new medical and technological applications.” MEH

# Agenda

## Selected schedule of regional medical meetings, conferences and exhibitions

Event	Date / City	Contact
<b>■ October 2015</b>		
SKMC Multispecialty Conference 2015	3 - 17 Oct 2015 Abu Dhabi, UAE	<a href="http://www.smc2015.ae">www.smc2015.ae</a>
Patient Safety Middle East 2015	4 - 6 October, 2015 Dubai, UAE	<a href="http://www.patientsafety-me.com">www.patientsafety-me.com</a>
4th International Conference on Surgery	5 - 7 October, 2015 Dubai, UAE	<a href="http://surgery.conferenceseries.com/">http://surgery.conferenceseries.com/</a>
7th Global Summit on Cancer Therapy	5 - 7 October, 2015 Dubai, UAE	<a href="http://cancer.global-summit.com/middleeast/">http://cancer.global-summit.com/middleeast/</a>
GCC Pharmaceutical Congress 2015	5 - 8 October, 2015 Dubai, UAE	<a href="http://www.gccpharmacongress.com">www.gccpharmacongress.com</a>
IMTEC 2015	7 - 8 October, 2015 Dubai, UAE	<a href="http://www.medicaltravelexhibition.com">www.medicaltravelexhibition.com</a>
5th Annual Case Based Approach to Controversies In Cardiovascular Disease	8 - 10 October, 2015 Dubai, UAE	<a href="mailto:Cardiovascular@InfoPlusEvents.com">Cardiovascular@InfoPlusEvents.com</a> <a href="http://www.cvuae.com/">www.cvuae.com/</a>
4th IPCAN (International Pharmacy Conference of Al Noor Hospital	9 October 2015 Abu Dhabi, UAE	<a href="mailto:cme@alnoorhospital.com">cme@alnoorhospital.com</a> <a href="http://www.ipcanuae.com">www.ipcanuae.com</a>
Mental Health Congress (WFMH 2015 )	16 - 19 October, 2015 Cairo, Egypt	<a href="http://www.wfmh2015.com/">www.wfmh2015.com/</a>
ICCNSE 2015: 17th Int'l Conference on Cognitive and Neural Systems Engineering	17 - 18 October, 2015 Dubai, UAE	<a href="http://www.waset.org/conference/2015/10/dubai/ICCNSE">www.waset.org/conference/2015/10/dubai/ICCNSE</a>
Ophthalmology Seminar	23 October, 2015 Abu Dhabi, UAE	<a href="mailto:cme@alnoorhospital.com">cme@alnoorhospital.com</a>
2nd Annual Medical Cities	25 - 27 October, 2015 Doha, Qatar	<a href="http://medicalcitieslse.marcusevans.com/">http://medicalcitieslse.marcusevans.com/</a>
Rheumatology and Medical Rehabilitation 2015	28 - 30 October, 2015 Kurdistan, Iraq.	<a href="mailto:toc@theorganizers-iraq.com">toc@theorganizers-iraq.com</a> <a href="http://www.rheumatology/rehabilitation.com">www.rheumatology/rehabilitation.com</a>
MENA Orthopaedics Congress 2015	29 - 31 October, 2015 Dubai, UAE	<a href="mailto:info@menaorthopaedicscongress.com">info@menaorthopaedicscongress.com</a> <a href="http://www.menaorthopaedicscongress.com">www.menaorthopaedicscongress.com</a>
2015 UAE Cancer Congress	29 - 31 October, 2015 Dubai, UAE	<a href="mailto:uaecancercongress@mci-group.com">uaecancercongress@mci-group.com</a> <a href="http://www.uaecancercongress.ae/register.php">www.uaecancercongress.ae/register.php</a>
<b>■ November 2015</b>		
6th Global Diabetes Summit and Medicare Expo	2 - 4 November, 2015 Dubai, UAE	<a href="http://diabetesexpo.com/middleeast/">http://diabetesexpo.com/middleeast/</a>
Pharma Middle East	2 - 4 November, 2015 Dubai, UAE	<a href="http://middleeast.pharmaceuticalconferences.com/dubai/">http://middleeast.pharmaceuticalconferences.com/dubai/</a>



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Healthcare Investment MENA	2 – 4 November, 2015 Dubai, UAE	<a href="http://www.healthcareinvestmentmena.com/">www.healthcareinvestmentmena.com/</a>
International Quality and Patient Safety Conference	3 – 5 November, 2015 Jeddah, KSA	<a href="mailto:MAbdeljawad@kfshrc.edu.sa">MAbeljawad@kfshrc.edu.sa</a> <a href="mailto:Jcme@kfshrc.edu.sa">Jcme@kfshrc.edu.sa</a>
MENA Women's Health Congress	5 – 7 November, 2015 Dubai, UAE	<a href="mailto:info@maarefah-management.org">info@maarefah-management.org</a> <a href="http://www.cvent.com/events">www.cvent.com/events</a>
5th World Congress on Controversies to Consensus in Diabetes, Obesity and Hypertension (CODHy)	5 – 7 November, 2015 Istanbul, Turkey	<a href="http://www.codhy.com/2015/">www.codhy.com/2015/</a>
12th Congress of Arab Association of Urology	5 – 7 November, 2015 Dubai, UAE	<a href="http://aau2015.com/">http://aau2015.com/</a> <a href="mailto:neha.choudhary@mci-group.com">neha.choudhary@mci-group.com</a>
Global Summit & Expo on Dubai Healthcare	9 – 11 November, 2015 Dubai, UAE	<a href="http://www.healthcare.global-summit.com">www.healthcare.global-summit.com</a>
International Paediatric Medical Congress	12 – 14 November, 2015 Dubai, UAE	<a href="mailto:info@internationalpaediatriccongress.com">info@internationalpaediatriccongress.com</a> <a href="http://www.internationalpaediatriccongress.com/">www.internationalpaediatriccongress.com/</a>
Minimally Invasive Surgery Workshop	13 November, 2015 Abu Dhabi, UAE	<a href="mailto:cme@alnoorhospital.com">cme@alnoorhospital.com</a>
The Emirates Society of Laparo-Endoscopic Surgeons Congress 2015	18 – 21 November, 2015 Dubai, UAE	<a href="http://www.mmesa-esles2015.com">www.mmesa-esles2015.com</a> <a href="mailto:israa.al.ali@genesislewant.com">israa.al.ali@genesislewant.com</a>
Abu Dhabi International Conference in Dermatology & Aesthetics	19 – 20 November, 2015 Abu Dhabi, UAE	<a href="mailto:jerico@menaconf.com">jerico@menaconf.com</a> <a href="http://www.menaconf.com">www.menaconf.com</a>
XXI World Congress of Echocardiography and Cardiology	20-22 November, 2015 Istanbul, Turkey	<a href="http://www.worldchoistanbul.org/">www.worldchoistanbul.org/</a>
ICRM 2015: 17th Int'l Conference on Radiation Medicine	24 – 25 November, 2015 Dubai, UAE	<a href="http://www.waset.org/conference/2015/11/dubai/ICRM">www.waset.org/conference/2015/11/dubai/ICRM</a>
The First Annual Heart Failure Conference	26 - 27 November, 2015 Abu Dhabi, UAE	<a href="http://atnd.it/29163-0">http://atnd.it/29163-0</a> <a href="mailto:zandra@menaconf.com">zandra@menaconf.com</a>



### List your conference:

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