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UAE healthcare evolves as local hospitals perform complicated surgeries

Global Health Hub

Germany sets up hub to push digitization of global healthcare

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- Bioengineers develop world's smallest stent
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- Cleveland Clinic Abu Dhabi named as designated training centre for doctors

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Prognosis

Global Health Hub

In this issue we look at Germany and their new Global Health Hub. This is an ambitious initiative to digitize healthcare to help achieve the sustainability goals of the UN Agenda 2030. As the German Federal Minister of Health, Jens Spahn, noted: Global health is fragmented. In order to ensure the full implementation of the health-related Sustainable Development Goals, "we need a clear and coherent plan. We need to know who is in the lead in order to avoid duplication and chaos and ensure efficiency." Germany is proposing to take the lead to advance the digitalization of healthcare provision internationally.

In our UAE report we publish in brief a number of case studies from UAE hospitals which point to the country's growing ability to handle increasingly complex procedures locally and avoid patients having to travel overseas for treatment.

In local news, medical education in Dubai achieved a significant milestone recently when the first cohort of medical students – 49 fourth-year students from Mohammed Bin Rashid University of Medicine and Health Sciences (MBRU) – started their training at Mediclinic Middle East; and Abu Dhabi Health Services Company reported that it has served more than 73,000 patients through its unique mobile health clinics.

In other news, the WHO released their seventh WHO Report on the global tobacco epidemic. The organisation notes that although progress is being made with 2.4 billion people living in countries providing comprehensive cessation services, only 23 countries are providing these services. The WHO adds that although tobacco use has also declined proportionately in most countries, population growth means the total number of people using tobacco has remained stubbornly high.

The Sabin Vaccine Institute and The Aspen Institute have issued a call for the development of a universal flu vaccine with "coordinated effort to amplify and focus resources on the long-sought, but overdue achievement". They note that we need all hands on deck to bring about a universal vaccine that can take the threat of influenza off the table.

As in every issue, in this issue you will find a range of informative reviews, news and interviews.

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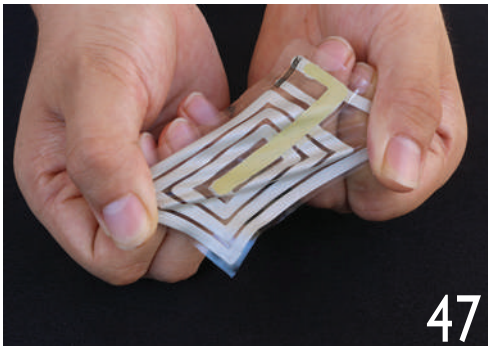

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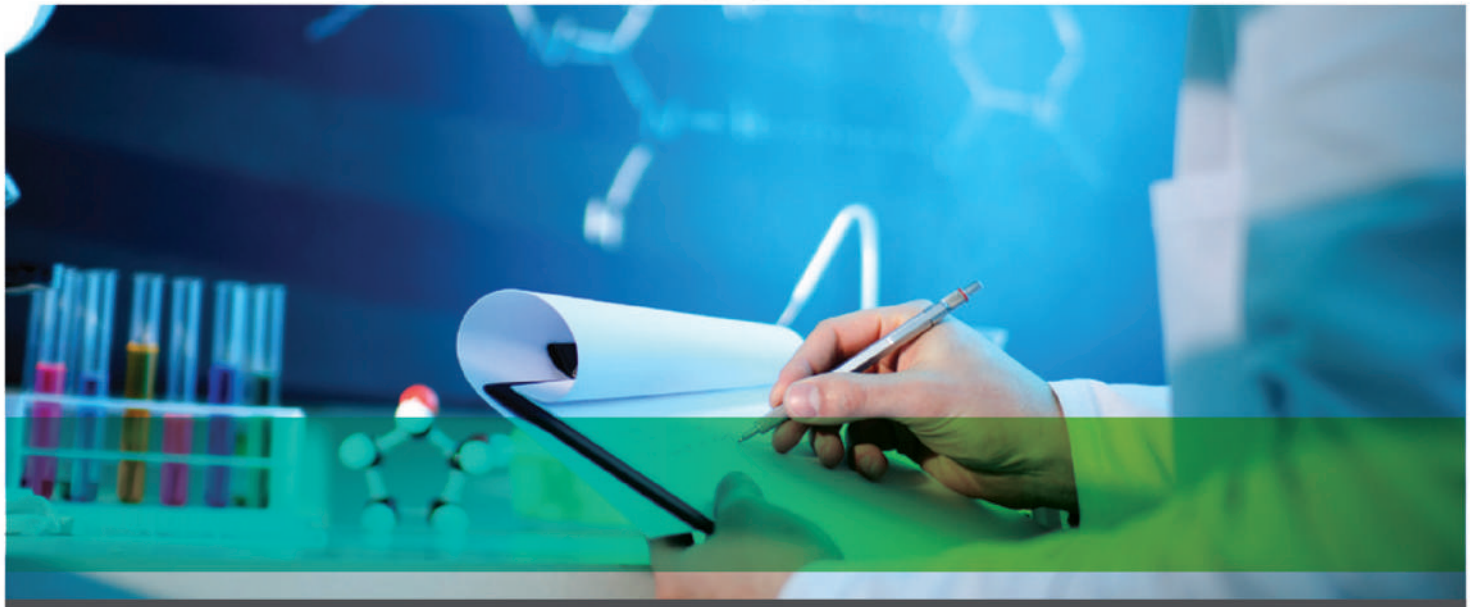

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middle east monitor

Update from around the region

(left to right): Ali Naffa, Quality and Patient Safety Officer; Zahra Mokhber, Lactation Consultant & BFHI Coordinator; Vasilica Iamandi, Nursing Director; Dr Rolf Hartung, Medical Director, Mediclinic City Hospital.

Mediclinic City Hospital awarded baby-friendly accreditation

Mediclinic City Hospital was awarded baby friendly accreditation in July from the Baby-Friendly Hospital Initiative (BFHI), becoming the first private hospital in Dubai to receive such recognition.

BFHI is a global programme which was initiated by the World Health Organization (WHO) and the United Nations Children's Fund (UNICEF) in 1991. The aim of BFHI is to implement practices that protect, promote and support breastfeeding. This programme is known to improve the health and wellbeing of all women and babies by providing high quality maternity services to enable mothers to breastfeed successfully.

The BFHI programme is embodied in the "Ten Steps to Successful Breastfeeding", including the "International Code of Marketing of Breast-milk Substitutes". Mediclinic City Hospital implements and meets the criteria of BFHI as per WHO and UNICEF guidelines updated in 2018. All mothers and babies at the hospital are well supported under this project regardless of their choice of feeding method.

Evidence-based research has revealed many health benefits of breastfeeding for both mother and baby. Breastfeeding provides a complete and ideal source of nutrition for infants up to six months of age and continues to be important after the first six months after other foods are introduced. It helps babies to develop their immune system and reduces their less risk of developing diseases. Research has also shown that it can improve the baby's intelligence and brain development. Similarly, breastfeeding can also help mothers with their physical and psychological health.

"Receiving baby friendly accreditation for Mediclinic City hospital is a brilliant achievement. It recognises all the hard work and effort that has been put in across the hospital over the last five years to implement practices that protect, promote and support breastfeeding," said Matthew Dronsfield, Hospital Director, Mediclinic City Hospital.

"The idea of Baby Friendly is to have highly educated staff that can empower mothers by providing the knowledge, skills and confidence they need to make the best decision about how to feed their babies," said Zahra Mokhber, Lactation Consultant and BFHI coordinator, Mediclinic City Hospital. "The hospital set this policy as a guideline and started widespread training of the all staff who deal with pregnant women, mothers and babies, particularly in Maternity, Postnatal, NICU and Paediatric wards, as well as the obstetrics/gynaecology and paediatric outpatient clinics. The education for mothers starts with communication on the importance of breastfeeding for expectant mothers, continues all through their baby's birth, hospital stay and follow-up in the lactation clinic after they go home."

Due to its commitment to excellence, the figures show that more than 95% of new mothers at Mediclinic City Hospital initiate skin to skin and breastfeeding within the first hour after birth and chose to breastfeed exclusively. All healthy babies are kept with their mothers in the same room during their stay in the hospital and encouraged to continue rooming-in at home for the first year of life, as globally recommended.

Cleveland Clinic Abu Dhabi named as designated training centre for doctors

Cleveland Clinic Abu Dhabi has been named as a designated testing centre for doctors looking to develop and improve minimally invasive surgery techniques, becoming one of only three such centres in the MENA region.

The program, which is a key requirement for physicians seeking board certification in the United States, has been developed to ensure that doctors have the skills and knowledge required to conduct laparoscopies, with the goal of improving quality of care and safety, and reducing complication rates.

Laparoscopy is a type of minimally invasive surgical procedure that enables surgeons to access the inside of the abdomen and pelvis without having to make arge incisions in the skin. This technique reduces pain, decreases hospital stay, and decreases rates of complications such as wound infections and hernia.

"Laparoscopic surgery has become an important option for physicians and patients because it improves patient outcomes and recovery time," said Dr Ricard Corcelles, Staff Surgeon in the Digestive Disease Institute at Cleveland Clinic Abu Dhabi. "As part of our role as an academic research centre, Cleveland Clinic Abu Dhabi continues to look to share our expertise with the wider medical sector, and this is clearly an area where more education and training will lead to better outcomes."

The accrediting body, Society of American Gastrointestinal and Endoscopic Surgeons (SAGES) the leading US-based laparoscopic surgery society, assessed Cleveland Clinic during a two-day inspection and passed the facility

as a test center for the 'Fundamentals of Laparoscopic Surgery' (FLS) program in July. Surgeons seeking this certification can now receive hands-on, technical skills-based assessment at the Abu Dhabi hospital.

The FLS module, 'Fundamentals of Laparoscopic Surgery', is part of a web-based education program which also includes a practical training and skills assessment component. Cleveland Clinic Abu Dhabi is one of only three centres in the MENA region to have been accredited by SAGES as a designated test centre.

Cleveland Clinic Abu Dhabi continues to implement educational and research initiatives designed to further enhance the level of healthcare and introduction of advanced technologies in the UAE. At the start 2019, the hospital received institutional accreditation from the Accreditation Council for Graduate Medical Education International LLC (ACGME-I) for its residency program, joining a select number of elite academic medical centres in the region to earn this distinction.

Two UAE hospitals partner to create bilateral knowledge sharing platform

Dubai-based Canadian Specialist Hospital and Al Kuwait Hospital have signed an MoU to share their combined wealth of knowledge with doctors and medical practitioners in the UAE to further raise the industry standards.

As a result of this MoU, both the hospitals will host 4-5 knowledge sharing events through the year that will create an ecosystem to share best practices within the healthcare sector. Both hospitals played host to top cardiologists in the UAE to discuss the 'Latest Trends in General Cardiology and Interventional Cardiology'. The inaugural convention in July attracted 250 medical experts from across the UAE in the field of general and interventional cardiology.

According to experts, people in the Emirates die of heart attack 20 years earlier than the global average. This forum was conceptualized due to this alarming rise in cardiovascular diseases in the country. Cardio-vascular diseases are the leading cause of death in the country.

Vivek V Thigale, Chief Operating Officer, Canadian Specialist Hospital, said: "This joint initiative is an important step taken by both the hospitals to ensure that the collective intelligence of doctors will help solve such healthcare challenges and stay ahead. We were delighted to see specialists in the field of cardiology and interventional cardiology under one roof discussing the latest trends in their field of study. This was the first of many conferences that we plan to organise in collaboration with Al Kuwait Hospital in the coming year."

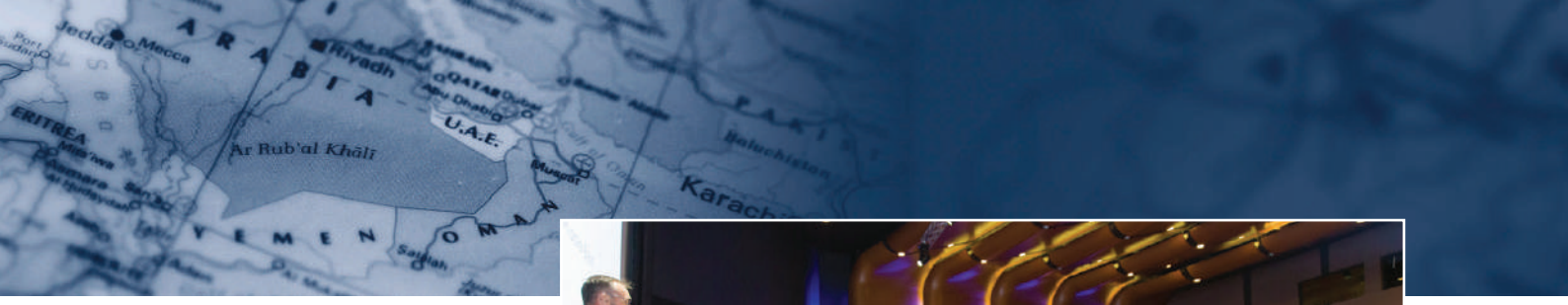
Abdulrazaq Ameri, Director, Al Kuwait Hospital, said: "It is a pleasure to be associated with Canadian Specialist Hospital. With this MoU we can help cultivate a culture which promotes sharing knowledge, resources and healthcare practices. The UAE is one of the most resourceful healthcare destinations in the Middle East region and with our program we aim to achieve a standardized level of quality healthcare practices throughout the Emirates. This is a great step forward for the healthcare industry in the UAE and the region".

The MoU was signed between Vivek V Thigale, Chief Operating Officer, Canadian Specialist Hospital and Abdulrazaq Ameri, Director, Al Kuwait Hospital. Also present for the signing were, Abdul Shukoor, CFO, and Anoop Achuthan, Head Business Development from Canadian Specialist Hospital and Dr Samya Mohammed Al Mulla, Head of Training & Professional Development Department, Moza Nasser Al Shamsi, Head of Customer Happiness Department from Al Kuwait Hospital.

More than 73,000 patients receive screening and treatment through SEHA's mobile health clinics

More than 73,000 patients received screening and treatment through Abu Dhabi Health Services Company (SEHA) unique mobile health clinic offerings in the year to May 2019. Serving the community since 2010, these mobile clinics reflect SEHA's heritage and legacy in providing advanced, accessible healthcare for the community, in line with the objectives of Abu Dhabi Government.

Mohammed Hawas Al Sadid, Ambulatory Healthcare Services CEO, said: "SEHA is the cornerstone of the healthcare sector in Abu Dhabi and is the only provider with a genuine network that can create value across the system for patients. This network includes 3 mobile clinics fully equipped to provide curative and preventive services for major events and remote areas. What sets these clinics apart is that they are connected to SEHA's electronic medical record, Malaffi, which ensures that appropriate care is provided



and the risk of complications is reduced due to the availability of critical medical information such as allergies.

SEHA Mobile Clinics 1 and 2 consist of two examination rooms, a nursing room, a dental clinic, a phlebotomy room,an x-ray room, and a waiting area for 6 people, while SEHA clinic 3 is composed of 2 examination rooms, an x-ray room, a phlebotomy room, and a waiting room for 10 people.

Through these mobile health clinics, SEHA conducts comprehensive student check-ups for grade 1, 5, and 9 in private and public schools, which includes vitals, vision, hearing, spine curvature and dental care, in addition to health education and blood work in line with the standards of the Department of Health in Abu Dhabi (DOH).

In addition, through the mobile clinics SEHA provides healthcare services for major UAE events such as the UAE National Day, UAE Government Annual Meetings, International Defense Exhibition and Conference (IDEX), Special Olympics World Games Abu Dhabi, and Al Dhafra Festival.

Furthermore, and in a bid to ease access to preventive healthcare services, SEHA mobile health clinics are licensed to conduct "Weqaya", a DOH screening program, which enables patients to get a better understanding of their wellbeing and take the necessary preventive measures by improving their lifestyles. The tests, which can all be completed within the mobile clinic, include clinical examinations; lab work for blood sugar, cholesterol and vitamin D; measurement of blood pressure, body mass index, renal function, smoking status, and physical activity levels. A specialist at the mobile clinic can share the results within 72 hours and discuss options for treatment if required.

First cohort of medical students welcomed to Mediclinic Middle East from MBRU

As part of an affiliation agreement between Mediclinic Middle East and Mohammed Bin Rashid University of Medicine and Health Sciences (MBRU) for the training of medical students, the first group of 49 fourth-year medical students was welcomed to Mediclinic Middle East in an inaugural ceremony on August 26, 2019, which marked their arrival and celebrated the progression of their studies.

The students will now commence their clinical clerkship in Mediclinic Middle East's hospitals and clinics in Dubai, joining the departments of Family Medicine, Surgery, Paediatrics, Internal Medicine and Dermatology in rotation over a 40-week period per year. Once they have completed their full six-year course, including their clerkships at Mediclinic, students will have attained an MBBS degree and be eligible to enter a UAE residency programme or undertake postgraduate studies overseas.

Professor Alawi Alsheikh Ali, Dean of the College of Medicine at MBRU said: "We are very proud of our students who have worked hard over the past three years to be ready for this phase of their learning experience at MBRU. We are fortunate to have a strong and mutually beneficial affiliation with Mediclinic and the Ministry of Health and Prevention who have been very supportive of the educational journey of our students. Together, we are working towards advancing the academic care model in Dubai and the UAE."

Dr. Leon Du Preez, Senior Corporate Medical Director at Mediclinic Middle East and Honorary Associate Dean for Academic Partnerships said: "We are delighted to welcome this first group of students as part of an affiliation with MBRU which I hope will last for many years. Working together in this way, we are able to support the United Arab Emirates' long-term vision of training the next generation of doctors and medical professionals for the challenges posed by a rapidly evolving healthcare landscape."

Mediclinic Middle East is part of Mediclinic International, a private hospital group with three operating platforms in Southern Africa (South Africa and Namibia), Switzerland and the United Arab Emirates, and a 29.9% shareholding in Spire Healthcare, a UK-based healthcare group with 38 hospitals.

Mediclinic Middle East operates seven hospitals and 20 clinics with over 900 inpatient beds in the United Arab Emirates. MEH

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Update from around the globe

Genetic counselling and technological infrastructure for the All of Us research program to be provided by Color

The *All of Us* Research Program, part of the US National Institutes of Health, has awarded $4.6 million in initial funding to Color, a health technology company in Burlingame, California, to establish the program's nationwide genetic counselling resource. With the goal of speeding up health research breakthroughs, *All of Us* plans to sequence the genomes of 1 million participants from diverse communities across the United States. Through this funding, Color's network of genetic counsellors will help participants understand what the genomic testing results mean for their health and their families.

As one of the most ambitious research programs in history, the *All of Us* Research Program aims to create the largest and most diverse health research resource of its kind. Participants from all parts of the country share health information over time through surveys, electronic health records and more. Some participants also are invited to contribute blood and urine samples for analysis. Researchers will be able to use this data to learn more about how biology, behaviour and environment influence health and disease, which may lead to discoveries on how to further individualize health care in the future.

"Returning results in a responsible way is integral to what *All of Us* stands for," said All of Us Director Eric Dishman. "Participants are our partners in research, who may want to receive their own health data, including genomics. The genetic counselling resource will help our participants interpret and act upon their health information."

This award is in addition to Color's ongoing funding in collaboration with the Broad Institute and Harvard's Laboratory of Molecular Medicine, Cambridge, Massachusetts, which together received one of the three All of Us genome center awards announced in September 2018. As centres prepare to begin genotyping and whole genome sequencing in coming months, participants will be able to decide whether to receive test results.

Over time, the program anticipates providing several kinds of information to participants, including: information on ancestry and traits, drug-gene interactions (pharmacogenomics) and genetic findings connected with high risk of certain diseases. Genomic results from *All of Us*, although produced at a high quality in specially certified labs, should be confirmed by a health care provider before a participant makes any changes to their care. The pharmacogenomic information may help participants work with their health care teams more effectively to make choices about certain prescription drugs. Genetic findings tied to 59 genes associated with risk of specific diseases, like breast cancer or heart disease, for which there are established medical guidelines for treatment or prevention will also be returned to participants. To ensure that the program uses the most current knowledge in the fast-moving field of clinical genetics, *All of Us* is following guidance from professional organizations such as the American College of Medical Genetics and Genomics and the Clinical Pharmacogenetics Implementation Consortium.

As health-related information is made available, all participants will have access to genetic counselling services from Color. A small percentage of people will have DNA results, such as a variation in the breast cancer gene BRCA1, that may be important for treatment or screening. This information can also be valuable to their immediate family members who may share the same genetic variant. For All of Us, that could amount to tens of thousands of participants out of its eventual 1 million. Color will deliver the results to these participants in genetic counselling sessions, highlighting any important findings they may want to discuss with a health care provider.

"The *All of Us* Research Program is a prime example of using technology to support geographically distributed and diverse research volunteers," said Othman Laraki, chief executive officer of Color. "This ambitious program relies on a deeply unified process, which includes engaging participants, gathering health information, sequencing genomes, interpreting data and securely and responsibly returning results. We are honoured to provide the technological backbone – software and services including our genetic counselling program – to extend the reach of this groundbreaking effort across all 50 states and showcase a scalable model for the integration of genomics into public health."

Global Fund welcomes contributions from Germany and the EU

The Global Fund welcomed the European Union's and Germany's renewed commitment to end AIDS, tuberculosis and malaria and build strong systems for health.

President of the European Council Donald Tusk announced on behalf of the EU a pledge of €550 million for the Global Fund's Sixth Replenishment during the G7 Summit in Biarritz. This represents an increase of 16 percent over their previous contribution.

The pledge signals the EU's strong leadership in global health and reinforces Europe's strong commitment to ending the three diseases by 2030.

Also at the G7 Summit, German Chancellor Angela Merkel announced a pledge of €1 billion for the upcoming three-year period, representing a 17.6% increase.

"By pledging €1 billion, Germany is truly demonstrating its commitment to stepping up the fight against HIV, TB and malaria and to accelerating progress towards the Sustainable Development Goal of health and well-being for all," said Peter Sands, Executive Director of the Global Fund. "We thank Chancellor Merkel for her steadfast leadership in global health. With such extraordinary support we can save millions of lives, get back on track toward ending the epidemics and help build the resilient and sustainable systems of health essential for the delivery of universal health coverage."

Germany has been a strong supporter of

the Global Fund partnership since its inception in 2002 and is its fourth-largest donor. Germany's investments have helped the Global Fund partnership save more than 27 million lives and reduce deaths from AIDS, TB and malaria by one-third. Through this support, the Global Fund has also become the largest multilateral investor in health systems investing US$1 billion a year to build more resilient and sustainable systems for health.

"The EU has been a strong supporter of the Global Fund since its creation, when the AIDS, malaria and tuberculosis epidemics seemed to be unbeatable," said Jean-Claude Juncker, President of the European Commission.

The European Union has played a leadership role in decision-making and governance at the Global Fund and has been a strong advocate for building resilient and sustainable systems for health, for addressing special challenges facing women and girls, and for reaching key populations affected by HIV, tuberculosis and malaria.

"The European Union has shown tremendous leadership in making this pledge, which comes at a critical moment in the fight against HIV, TB and malaria," said Sands, Executive Director of the Global Fund. "We thank the EU for this extraordinary commitment to step up the fight against the three epidemics, saving millions of lives and building the resilient and sustainable systems for health essential to deliver universal health coverage."

The EU is the sixth-largest donor to the Global Fund. With this pledge, it will have committed more than €2.6 billion since the Global Fund's inception in 2002. Together with its member states, they represent nearly half of the total funding to the Global Fund.

France will convene the Global Fund's Sixth Replenishment pledging conference on 9-10 October 2019 in Lyon, France. The Global Fund seeks to raise at least US$14 billion for the next three years. The funds will help save 16 million lives, cut the mortality rate from HIV, TB and malaria in half, and build stronger health systems by 2023.

Johns Hopkins Medicine researchers identify health conditions most likely to cause serious harm when misdiagnosed

For a patient, a diagnostic error can mean the difference between life and death. While estimates vary, likely more than 100,000 Americans die or are permanently disabled each year due to medical diagnoses that initially miss conditions or are wrong or delayed.

Now a research team, led by a Johns Hopkins Armstrong Institute for Patient Safety and Quality expert, reports it has identified three major disease categories — vascular events, infections and cancers — that account for nearly three-fourths of all serious harms from diagnostic errors. The team's findings, based on analysis of a large repository of malpractice insurance claims, are described in a paper published online in the journal Diagnosis.

The researchers found that diagnostic errors were the most common, most catastrophic and most costly of medical mistakes. Diagnostic errors leading to death or serious, permanent disability were associated with misdiagnosed cancers (37.8%), vascular events (22.8%) and infections (13.5%) — categories that the team led by David Newman-Toker, M.D., Ph.D., director of the Johns Hopkins Armstrong Institute Center for Diagnostic Excellence, calls the "big three". The authors describe 15 specific "big three" conditions that together account for nearly half of all the serious, misdiagnosis-related harms. The top conditions in each category are stroke, sepsis and lung cancer, respectively. These are accompanied by heart attack, venous thromboembolism, aortic aneurysm and dissection (a rupture of the aorta), arterial thromboembolism, meningitis and encephalitis, spinal infection, pneumonia, endocarditis and breast, colorectal, prostate and skin cancers.

"We know that diagnostic errors happen across all areas of medicine. There are over 10 thousand diseases, each of which can manifest with a variety of symptoms, so it can be daunting to think about how to even begin tackling diagnostic problems," says Newman-Toker, "Our findings suggest that the most serious harms can be attributed to a surprisingly small number of conditions. It still won't be an easy or quick fix, but that gives us both a place to start and real hope that the problem is fixable."

Based on claims data, the analysis also found that failures of clinical judgment were identified as causes in more than 85% of the misdiagnosed cases. The researchers say this adds to growing evidence that health care systems must do more to support bedside diagnostic decision-making by clinical providers. The authors point to interventions such as deploying computer-based diagnostic decision support tools, increasing immediate access to specialists at the point of care, supporting more effective teamwork and patient engagement in diagnosis, providing routine diagnostic performance feedback for clinicians and improving diagnostic education through simulation training.

Researchers also found that most of the diagnostic errors (71.2%) associated with the malpractice claims occurred in ambulatory settings – either in emergency departments, where missed infections and vascular events such as strokes were more of a concern, or outpatient clinics, where misdiagnoses were more likely to be cancer-related. "These findings give us a road map for thinking about what kind of problems we need to solve in which clinical settings," Newman-Toker says.

He cautions that the focus on serious harms in the analysis leaves out many chronic or long-term conditions such as migraines or multiple sclerosis that can be misdiagnosed for years or even decades, leading to substantial patient suffering even if the diseases are eventually treated. He also says there is a bias built in the types of cases brought forth by attorneys that could have affected their findings. "It's easier to bring a cancer claim forward,

for example, since there's usually more of a paper trail," he says.

To address this anticipated bias, Newman-Toker and the research team analysed previously published studies using nonclaims data from various clinical care settings. They still found that roughly three-quarters of diagnostic error cases were associated with the "big three" disease categories — though, unlike with the malpractice claims data, vascular events and infections dominated over cancers.

"The high percentage of serious-harm cases attributable to these 'big three' categories of conditions is likely accurate, despite the inherent biases in malpractice data," Newman-Toker says.

He says the findings suggest that harms from diagnostic errors could be substantially reduced over the next decade, but only if the medical community takes seriously the National Academy of Medicine's 2015 call to action that improving diagnosis "represents a moral, professional and public health imperative."

The researchers plan to build on their findings as they continue the phases of their planned three-part study. The next phase will estimate how frequently the 15 most common conditions are misdiagnosed, and the final phase will use nationally representative data sets to derive a population-level estimate of the total number of people in the U.S. harmed by diagnostic error each year.

- **doi:** 10.1515/dx-2019-0019

Sabin Vaccine Institute and The Aspen Institute call for coordinated commitments to make universal flu vaccines a reality

A new report released 25 July by the Sabin-Aspen Vaccine Science & Policy Group, a joint initiative of the Sabin Vaccine Institute and the Aspen Institute, calls for an urgent, coordinated effort to amplify and focus resources on the long-sought, but overdue achievement of a universal influenza vaccine (UIV). The report, titled "*Accelerating the Development of a Universal Influenza Vaccine*," is the result of a 9-month effort from a cross-disciplinary group of 24 internationally recognized experts and innovators with experience in government, public health, industry, finance, philanthropy, and advocacy. With 300,000 to 650,000 people killed annually from influenza and millions of lives threatened by the emergence of a pandemic strain, influenza remains one of the world's most serious infectious disease threats.

Designed to close the critical gaps in the organization, funding, and infrastructure of vaccine science and development, the report includes three "big ideas" to transform and accelerate the development of a UIV. Assessments of the current challenges and opportunities within the vaccine research and development ecosystem are detailed in the four background papers that frame the key findings of the report.

"The breakthroughs needed to eliminate the burden and threat of influenza will require a coordinated, singularly-focused effort on UIV development that leverages the combined resources of governments, industry, philanthropy, and academia," said Harvey V. Fineberg, M.D., Ph.D., President of the Gordon and Betty Moore Foundation and a Sabin-Aspen Group co-chair.

Among its key recommendations, the report calls for:

- Creation of an entity to spearhead accelerated development of a UIV
- Catalyzing the advancement of a transformational and innovative research and development agenda that broadens the range of scientific perspectives and resources in pursuit of a UIV
- Implementation of a communications strategy that reinforces the true potential impact of an influenza pandemic and the urgency of the need for a UIV

"To achieve the critical goal of a UIV, we must extend the range of scientific and technological capabilities and focus them on solutions to the intractable problems that to date have thwarted our success," said Shirley M. Tilghman, president emerita of the university, professor of molecular biology and public affairs at Princeton University and Sabin-Aspen Group co-chair.

"We need all hands on deck to bring about a universal vaccine that can take the threat of influenza off the table," said Bruce Gellin, M.D., M.P.H., Sabin's president of Global Immunization and lead on influenza efforts. "We are excited to share this report, and proud of our partnership with The Aspen Institute and these leaders to bring innovative thinking to this critical issue."

Vaccination provides the best way to prevent influenza infection, which is recommended annually. Even if it does not prevent influenza, your illness is likely to be less severe if you have received the vaccine. However, current vaccines and vaccination strategies are suboptimal. Each year, researchers can only make their best guess at vaccine formulation based on calculations of which strains are most likely to emerge. Today, it can take as long as a year to manufacture the vaccine, and the vaccine rarely covers all the strains circulating at the time of use.

Underperformance from current vaccines combined with public under-appreciation of the true threat of influenza often contributes to low vaccination rates.

Ruth Katz, Executive Director of the Aspen Institute Health, Medicine and Society (HMS) Program, said: "We need to take urgent and immediate steps to close the gaps in influenza vaccine development. We hope this report helps spur the efforts necessary to overcome these critical challenges."

- Download the report:

Accelerating the development of a universal Influenza vaccine

www.influenzer.org/#report MEH

Not every wheeze is asthma

People who experience breathlessness during exercise tend to be diagnosed with exercise-induced asthma. However, for some patients, these symptoms are not alleviated by standard asthma treatments. Instead, the cause may be a laryngeal obstruction.

For these patients, exercise-induced laryngeal obstruction (EILO) should be considered. EILO is a reversible narrowing of the larynx that occurs during high-intensity exercise. It impairs airflow, causes shortness of breath, wheezing and often, discomfort in the throat and upper chest.

Compared to asthma or other breathing disorders, EILO is characterised by exercise-induced 'stridor', a harsh inspiratory sound due to turbulent airflow through a narrow laryngeal opening.

Symptoms of EILO typically reach their highest point towards the peak intensity of an exercise session an

Diagnosis

At Royal Brompton & Harefield Hospitals Specialist Care, consultant respiratory physician Dr James Hull regularly treats adult patients misdiagnosed with asthma. Patients under the age of 16 are treated by Dr Samatha Sonnappa.

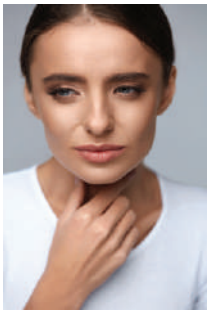
Dr Hull explains. "The only way to really tell the difference between EILO and asthma is to look at how the airways are closing. This requires specialist equipment for accurate diagnosis."

This test is called a continuous laryngoscopy during exercise (CLE), and it is not widely available. RB&HH Specialist Care is one of only a few centres able to offer a CLE test to patients.

Seeing is believing

During the CLE test, the consultant attaches a fibreoptic laryngoscope to specialist headgear, then takes a continuous visual recording of the larynx while the patient exercises.

Firstly, one of the nostrils is numbed, then the laryngoscope is gently passed up the



RB&HH SPECIALIST CARE

nostril to the back of the throat. Then, while attached to an electrocardiogram (ECG), patients will exercise on a static bike or treadmill to the point of breathlessness.

Treatments

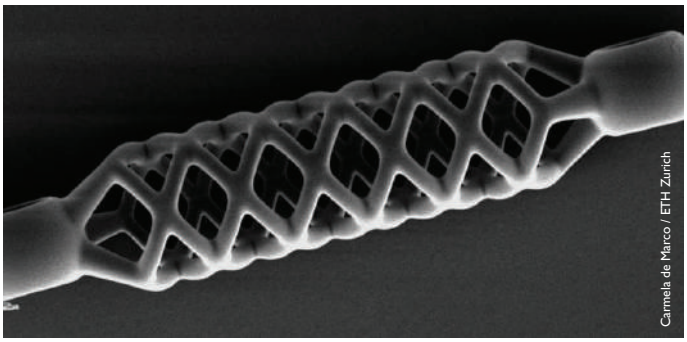
Once diagnosed with EILO, patients can often control their symptoms with therapies such as improving laryngeal hygiene, ensuring adequate fluid intake, treating nasal problems and using specialist breathing techniques.

Surgery may be an option for patients who have tried more conservative management therapies and have seen no improvement.

- To find out more email *privatepatients@rbht.nhs.uk* or visit *rbhh-specialistcare.co.uk* MEH

the laboratory

Medical research news from around the world



This micro stent is just 50 micrometers (0.05 mm) wide and half a millimeter long.

Swiss researchers develop world's smallest stent

Researchers at ETH Zurich have developed a new method for producing malleable microstructures – for instance, vascular stents that are 40 times smaller than previously possible. In the future, such stents could be used to help to widen life-threatening constrictions of the urinary tract in foetuses in the womb.

Approximately one in every thousand children develops a urethral stricture, sometimes even when they are still a foetus in the womb. In order to prevent life-threatening levels of urine from accumulating in the bladder, paediatric surgeons like Gaston De Bernardis at the Kantonsspital Aarau have to surgically remove the affected section of the urethra and sew the open ends of the tube back together again. It would be less damaging to the kidneys, however, if a stent could be inserted to widen the constriction while the foetus is still in the womb.

Stents have been used to treat blocked coronary vessels for some time now, but the urinary tract in foetuses is much narrower in comparison. It's not possible to produce stents with such small dimensions using conventional methods, which is why De Bernardis approached the Multi-Scale Robotics Lab at ETH Zurich. The lab's researchers have now developed a new method that enables them to produce highly detailed structures measuring less than 100 micrometres in diameter, as they report in a recently published in Advanced Materials Technologies.

"We've printed the world's smallest stent with features that are 40 times smaller than any produced to date," says Carmela De Marco, lead author of the study and Marie Skłodowska-Curie fellow in Bradley Nelson's research group. The group calls the method they've developed indirect 4D printing. They use heat from a laser beam to cut a three-dimensional template – a 3D negative – into a micromould layer that can be dissolved with a solvent. Next, they fill the negative with a shape-memory polymer and set the structure using UV light. In the final step, they dissolve the template in a solvent bath and the three-dimensional stent is finished.

It's the stent's shape-memory properties that give it its fourth dimension. Even if the material is deformed, it remembers its original shape and returns to this shape when warm. "The shape-memory polymer is suitable for treating urethral strictures. When compressed, the stent can be pushed through the affected area. Then, once in place, it returns to its original shape and widens the constricted area of the urinary tract," De Bernardis says.

But the stents are still a long way from finding real-world application. Before human studies can be conducted to show whether they are suitable for helping children with congenital urinary tract defects, the stents must first be tested in animal models. However the initial findings are promising, "We firmly believe that our results can open the door to the development of new tools for minimally invasive surgery," De Marco says.

- **doi**: 10.1002/admt.201900332

Charité researchers discover new mechanism of resistance

There are numerous different scenarios in which microorganisms are exposed to highly reactive molecules known as free radicals. These molecules are capable of damaging important cell components and may be generated during normal cell metabolism or in response to environmental factors. Free radicals play a significant role in antibiotic effectiveness, the development of diseases and the normal functioning of the human immune system. A team of researchers from Charité – Universitätsmedizin (University of Medicine) Berlin has discovered a previously unknown mechanism which enables microorganisms to protect themselves against free radicals. Their findings may help improve the efficacy of antimicrobial substances. Results from this research have been published in *Nature*.

The term free oxygen radicals refers to highly reactive oxygen molecules which are capable of damaging a range of important cell structures such as proteins, DNA and cell membranes. While free radicals represent a destructive force, it is one which the human body has learned to exploit. Some cells of the human immune system produce free radicals as part of their fight against invading microorganisms. Metabolic processes also result in the production of free radicals when microbial cells come into contact with antibiotics. This is an important factor behind their activity. Microorganisms have developed various mechanisms to intercept and neutralize these highly reactive molecules in order to deflect an immune system attack. An international team of researchers led by Prof. Dr Markus Ralser, Director of Charité's Institute of Biochemistry, has now been able to show that microorganisms also have another, previously unknown defensive strategy at their disposal. Compared with previously documented mechanisms, this strategy could prove particularly effective.

The researchers started their investigations using baker's yeast as the model organism, observing that yeast cells accumulate vast quantities of lysine, a building block used in the production of yeast proteins. After being absorbed from the environment, lysine was stored

at levels 70 to 100 times higher than those necessary for normal growth. Using mathematical modelling and genetic analysis to determine the purpose of this 'lysine harvest', the researchers discovered that yeast cells use the accumulated lysine to alter their own metabolism. One of the consequences of this reconfiguration was the production of extraordinary amounts of glutathione, one of the most important radical scavenging molecules found in living organisms. Following lysine harvest, yeast cells were shown to have significantly increased resistance against free radicals. This enabled them to break down quantities of free radicals which would normally have resulted in cell death. The researchers demonstrated that this resistance mechanism is used not only by different types of yeast, but also by bacteria.

"Our study shows that microorganisms absorb nutrients from their surroundings not only to enable growth, but also as a precautionary measure, to prepare against a potential attack by free radicals," explained Prof. Ralser. "This knowledge could prove useful in the future; if we succeeded in disrupting this resistance mechanism, we could potentially improve the efficacy of antimicrobial substances." The research group will continue its work with this aim in mind. "We will also search for other unknown resistance mechanisms. After all, an understanding of fundamental cellular processes is a prerequisite for the development of antimicrobial substances."

- **doi**: 10.1038/s41586-019-1442-6

Prior dengue infection protects against neonatal malformations associated with Zika virus

The Zika virus outbreak in Latin America has so far affected more than 60 million people. The infection can have devastating consequences for pregnant women and their children, many of whom are born with a type of brain malformation known as microcephaly. Prior infection with the genetically related dengue virus had been assumed to enhance the effects of subsequent Zika virus infection. Researchers from Charité – Universitätsmedizin Berlin and the German Centre for Infection Research (DZIF) have now shown that prior dengue infection protects against damage associated with Zika. Results from this research have been published in *Emerging Infectious Diseases*.

"We already know that Zika virus infection during pregnancy can damage the foetus, leading to microcephaly and other potentially serious symptoms," explains the study's lead investigator, Prof Dr Felix Drexler of Charité's Institute of Virology. Prof Drexler has been working with the DZIF for many years, developing diagnostic tests for Zika and other viruses.

"Until now, however, we failed to understand why there is an increased incidence of Zika-associated microcephaly in certain areas such as the Northeast of Brazil," says Prof Drexler. The international team of researchers set out to look for cofactors which might be responsible for determining whether a Zika virus infection during pregnancy will have devastating consequences.

The dengue virus, which is responsible for dengue fever and is widely spread across Latin America, was suspected to be one such cofactor. Initially, the researchers assumed that it was the human antibodies produced in response to prior dengue virus infection which might contribute to the foetal damage caused during subsequent infection with the Zika virus. It had been known for some time that, under certain conditions, these antibodies are capable of enhancing the effects of subsequent dengue infections with a different dengue virus serotype. In the case of Zika, however, the opposite appears to be true. "Surprisingly, our study shows that previous dengue infection protects against Zika-associated damage," emphasizes Prof Drexler.

In order to study interactions between dengue and Zika viruses, the researchers first compared the genomes of all known dengue viruses currently found in Brazil. They did so to establish whether, over the past few decades, the Northeast of Brazil had been exposed to different dengue viruses than those found in other regions, and whether people in the Northeast had developed different immunity as a result. They also conducted tests on 29 mothers who had developed Zika virus infection during pregnancy and whose babies were later born with microcephaly. These tests were conducted to determine whether these women had antibodies against the four types of dengue virus found in the area. 108 mothers who were seropositive for Zika virus infection but whose children were born healthy served as controls.

Summarizing the findings of the study, Prof Drexler says: "The results show that preexisting immunity against dengue virus significantly reduces the risk of Zika virus infection resulting in serious consequences for the unborn child. People with prior dengue infection therefore need not worry about subsequently developing more severe forms of Zika infection." This is both an important and reassuring message for pregnant women. It means that the researchers' initial suspicion – that the dengue virus might act as a cofactor for severe Zika virus infection in the unborn child – could not be confirmed. By continuing to look for other cofactors, the researchers are hoping to explain the increased incidence of microcephaly in the northeastern region of Brazil and to find ways to identify the development of microcephaly early on.

- **doi**: 10.3201/eid2508.190113

New pain organ discovered in the skin

Researchers at Karolinska Institutet in Sweden have discovered a new sensory receptor organ that is able to detect painful mechanical damage, such as pricks and impacts. The discovery is being published in the scientific journal *Science*.

Pain causes suffering and results in substantial costs for society. Almost one person in every five experiences constant pain and there is a considerable need to find new painkilling drugs. However, sensitivity to pain is also required for survival and it has a protective function. It prompts reflex reactions that prevent damage to tissue, such as pulling your hand

away when you feel a jab from a sharp object or when you burn yourself.

Researchers at Karolinska Institutet have now discovered a new sensory receptor organ in the skin that is sensitive to hazardous environmental irritation. It is comprised of glia cells with multiple long protrusions and which collectively go to make up a mesh-like organ within the skin. This organ is sensitive to painful mechanical damage such as pricks and pressure.

The study describes what the new pain-sensitive organ looks like, how it is organised together with pain-sensitive nerves in the skin and how activation of the organ results in electrical impulses in the nervous system that result in reflex reactions and an experience of pain. The cells that make up the organ are highly sensitive to mechanical stimuli, which explain how they can participate in the detection of painful pinpricks and pressure. In experiments, the researchers also blocked the organ and saw a resultant decreased ability to feel mechanical pain.

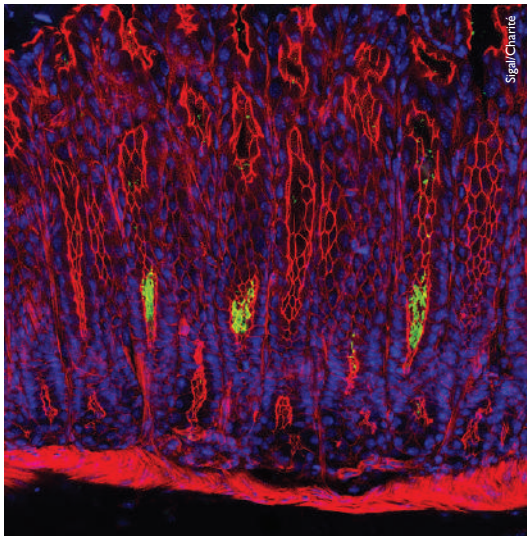
"Our study shows that sensitivity to pain does not occur only in the skin's nerve fibres, but also in this recently-discovered pain-sensitive organ. The discovery changes our understanding of the cellular mechanisms of physical sensation and it may be of significance in the understanding of chronic pain," says Patrik Ernfors, professor at Karolinska Institutet's Department of Medical Biochemistry and Biophysics and chief investigator for the study.

The research was carried out with financial assistance from ERC, the Swedish Research Council, the Knut and Alice Wallenberg Foundation and Welcome Trust.

• **doi**:10.1126/science.aax6452

Researchers show how gastric stem cells fight bacteria and prevent gastric cancer

Stem cells are not only key players in tissue regeneration, they are also capable of taking direct action against bacteria. This is the finding of a study conducted by researchers from Charité – Universitätsmedizin Berlin and the Max Planck Institute for Infection Biology, which describes what happens during a *Helicobacter pylori* infection of the human stomach. By actively fighting the colonizing bacteria, gastric stem cells protect themselves against damage that can lead to cancer. Results from this study have been published in *Nature Cell Biology*.



Cross-section of gastric epithelium (mouse model): Helicobacter pylori bacteria (green) colonize the gastric glands. Gastric epithelial cell nuclei are shown in blue, their cytoskeleton in red.

Approximately 50% of the world's population are infected with the bacterium *Helicobacter pylori*, the most important risk factor for gastric cancer. It colonizes the gastric epithelium and can cause DNA damage in epithelial cells. As the majority of affected cells are short-lived and replaced within a matter of days, such damage is unlikely to have serious consequences. However, the effects can be much more severe if the bacterium attacks the stem cells, which have a much longer lifespan. They are located deep inside the gastric gland and produce daughter cells destined to replace the mucosal cells at the surface. If the DNA of these stem cells is damaged by *H. pylori*, it may lead to the development of gastric cancer.

The researchers working on this new study were able to show that gastric stem cells employ active measures to fend off the bacteria. "Our animal model enabled us to observe that stem cells release a protein known as intelectin 1 into their surroundings," explains the study's first author, Dr. Michael Sigal, a BIH Charité Clinician Scientist based at the Medical Department, Division of Hepatology and Gastroenterology on Campus Charité Mitte. "Intelectin 1 binds to the surface of *Helicobacter pylori*, causing the bacteria to clump together. This stops them from entering the gastric gland cavity and damaging the stem cells located there."

The production of intelectin 1 is triggered by R-spondin 3, a signalling molecule which was previously shown to stimulate stem cell proliferation. R-spondin 3 secretion increases as soon as the body recognizes damage such as that caused by *H. pylori*. Summarizing the researchers' findings, the study's last author, Prof Dr Thomas Meyer, Director of the Max Planck Institute for Infection Biology, says: "The body responds to *Helicobacter pylori* infection by releasing a signalling molecule that stimulates the proliferation of gastric stem cells and promotes tissue regeneration. The same messenger molecule also causes neighbouring gastric stem cells to release antibacterial proteins that actively protect the stem cell niche against the invasion of pathogens. This mechanism enables the body to prevent the more serious consequences of infection, such as gastric ulcers and gastric cancer."

"We hope to use our findings to identify those *Helicobacter pylori*-infected patients in whom this protective mechanism is out of balance," adds Dr Sigal. "The idea is then to offer treatment options specifically to these people." The researchers suspect that these patients are at a particularly high risk of developing stomach cancer as a result of chronic *Helicobacter* infection. Therefore, they are planning to conduct further studies to investigate the link between stem cell-based protection mechanisms and cancer development – not just in the stomach, but throughout the gastrointestinal tract.

• **doi**: 10.1038/s41556-019-0339-9

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The MPOWER package gives governments the practical tools to help people kick the habit, adding years to their life and life to their years.

Progress made in fight against tobacco

Many governments are making progress in the fight against tobacco, with 5 billion people today living in countries that have introduced smoking bans, graphic warnings on packaging and other effective tobacco control measures – four times more people than a decade ago. But a new WHO report shows many countries are still not adequately implementing policies, including helping people quit tobacco.

The seventh WHO Report on the global tobacco epidemic analyses national efforts to implement the most effective measures from the WHO Framework Convention on Tobacco Control (WHO FCTC) that are proven to reduce demand for tobacco.

These measures, like the "MPOWER" interventions, have been shown to save lives and reduce costs from averted healthcare expenditure. The MPOWER report was launched in 2007 to promote government action on six tobacco control strategies in-line with the WHO FCTC to:

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

The focus of the latest report is on the progress countries have made to help tobacco users quit. It was launched in Brazil, a country that has become the second, after Turkey, to fully implement all the MPOWER measures at the highest level of achievement.

Dr Tedros Adhanom Ghebreyesus, WHO Director-General, said governments should implement cessation services as part of efforts to ensure universal health coverage for their citizens.

"Quitting tobacco is one of the best things any person can do for their own health," said Dr Tedros. "The MPOWER package gives governments the practical tools to help people kick the habit, adding years to their life and life to their years."

Progress is being made, with 2.4 billion people living in countries now providing comprehensive cessation services (2 billion more than in 2007). But only 23 countries are providing cessation services at the best-practice level, making it the most under-implemented MPOWER measure in terms of number of countries offering full coverage.

Tobacco cessation services include national toll-free quit lines, "mCessation" services to reach larger populations via mobile phones, counselling by primary healthcare providers and cost-covered nicotine replacement therapy.

Michael Bloomberg, WHO Global Ambassador for Noncommunicable Diseases and Injuries and founder of Bloomberg Philanthropies, said the report shows government-led efforts to help people quit tobacco work when properly implemented.

"More countries are making tobacco control a priority and saving lives, but there's still much more work to be done," said Bloomberg. "The WHO's new report shines a spotlight on global efforts to help people quit using tobacco and it details some of our most important gains."

The report, funded by Bloomberg Philanthropies, showed that while only 23 countries have implemented cessation support policies at the highest level, 116 more provide fully or partially cost-covered services in some or most health facilities, and another 32 offer services but do not cost-cover them, demonstrating a high level of public demand for support to quit.

Tobacco use has also declined proportionately in most countries, but population growth means the total number of people using tobacco has remained stubbornly high. Currently, there are an estimated 1.1 billion smokers, around 80% of whom live in low- and middle-income countries (LMICs).

The challenge of malaria eradication

The World Health Organization (WHO) says accelerated research and development (R&D) in new tools for malaria prevention and treatment is key if the world is to eradicate malaria in the foreseeable future: today less than 1% of funding for health

R&D investment goes to developing tools to tackle malaria.

WHO also flags the urgent need for progress to advance universal health coverage and improve access to services, and better surveillance to guide a more targeted malaria response.

The findings have emerged in a report from WHO's Strategic Advisory Group on Malaria Eradication (SAGme).

"To achieve a malaria-free world we must reinvigorate the drive to find the transformative strategies and tools that can be tailored to the local situation. Business as usual is not only slowing progress, but it is sending us backwards," according to Dr Marcel Tanner, Chair of the SAGme.

The group published the executive summary of its report ahead of a WHO-hosted forum on "Rising to the Challenge of Malaria Eradication" that was due to be held in Geneva on 9 September 2019.

Why malaria eradication matters

"Freeing the world of malaria would be one of the greatest achievements in public health," says Dr Tedros Adhanom Ghebreyesus, WHO Director-General. "With new tools and approaches we can make this vision a reality."

Eradicating malaria would both save lives and boost economies.

The health benefits would be greatest among some of the world's most vulnerable populations. Children under five account for 61% of all malaria deaths. More than 90% of the world's 400,000 annual malaria deaths occur in sub-Saharan Africa.

The group's analyses showed that scaling up current malaria interventions would prevent an additional 2 billion malaria cases and 4 million deaths by 2030 – provided those interventions reach 90% of the population in the 29 countries that account for 95% of the global burden.

The cost of this scale-up is estimated to be US$34 billion. The economic gain would be around $283 billion in total gross domestic product (GDP) – a benefit to cost ratio in excess of 8:1.

Overcoming challenges to eradication

Global malaria infection and death rates have remained virtually unchanged since 2015. WHO's World Malaria Report in 2018 revealed that the world is currently off track to achieve the 2030 goals set out in the WHO Global Technical Strategy for malaria 2016-2030 – i.e. a 90% reduction in the malaria case incidence and mortality rate.

In many countries, access to health services remains a major challenge. Only one in five pregnant women living in areas of moderate to high malaria transmission in Africa is able to obtain the drugs she needs to protect herself from malaria. Half the people at risk of malaria in Africa sleep under an insecticide-treated net and just 3% are protected by indoor spraying with insecticides.

This highlights the need to advance universal health coverage and strengthen health services and delivery systems, so everyone can access malaria prevention, diagnostics and treatment, when and where they need them, without suffering financial hardship.

The group noted the need to rethink approaches. WHO and partners are already establishing some new strategic approaches to tackling malaria. Last November, for example, WHO and the RBM Partnership to End Malaria launched the "High burden to high impact" approach. This aims to jumpstart progress against malaria by targeting attention to the 11 countries with 70% of the world's malaria burden – 10 African countries and India.

This complements efforts to secure certification among the countries seeking to eliminate malaria by 2020, the WHO "E-2020" initiative. So far, WHO has certified 38 countries and territories malaria-free.

The need for new technologies

Most of the tools being used to tackle malaria today were developed in the last century or even earlier: insecticide-treated mosquito nets, indoor residual spraying, rapid diagnostic tests and drugs based on artemisinin.

Promising new diagnostics, medications, insecticides and vector control approaches are being developed, alongside passive immunization therapies such as monoclonal antibodies. The world's first malaria vaccine, RTS,S/AS01, has been deployed in Ghana and Malawi, with plans for rollout in Kenya.

SAGme highlights the urgent need to scale up R&D to strengthen this pipeline, pointing to the Malaria Eradication Research Agenda (malERA), which provides a useful starting point to guide needed R&D investment.

Second round of oral cholera vaccine reaches nearly 400,000 in Yemen

In August, a 6-day oral cholera vaccination campaign in Yemen reached almost 400,000 people, including almost 65,000 children under the age of 5 in Aden, Al Dhale'e and Taiz, where high numbers of suspected cholera and acute watery diarrhoea cases have been recorded.

The first few months of 2019 saw an increase of reported acute watery diarrhoea cases in over 95% of districts across Yemen. Between January and the end of July 2019, there have been nearly 536,000 suspected cases and 773 associated deaths. Children under 5 represent one quarter of all suspected cases.

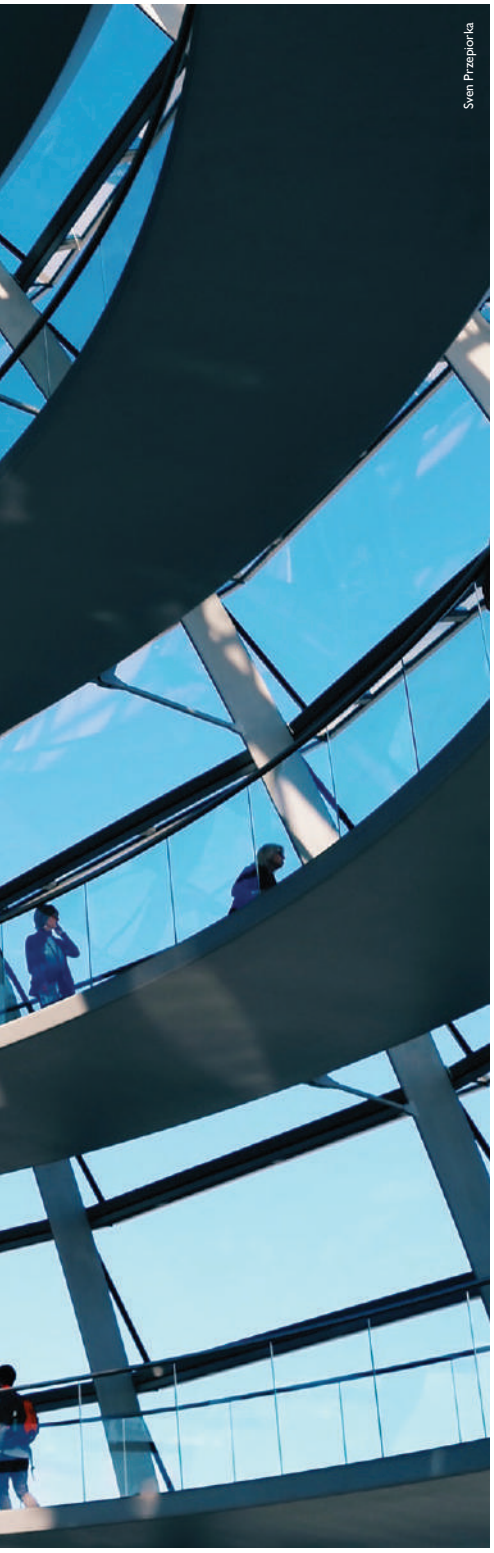
The vaccination campaign, run by local health authorities, UNICEF and WHO, was made possible thanks to GAVI, the Vaccine Alliance, and to the World Bank's 'Emergency Health and Nutrition Project'.

"Amid the fighting in surrounding areas, over 800 health workers, brave men and women, risked their lives to reach communities from cholera – these are the real heroes," said Altaf Musani, WHO Representative in Yemen.

"Thanks to the extraordinary commitment and dedication of Yemen's local health workforce, hundreds of thousands of people from these priority districts were reached with vaccination against cholera," said Sara Beysolow Nyanti, UNICEF Country Representative in Yemen.

Since April 2017, the cholera and acute watery diarrhoea epidemic in Yemen has caused an estimated 2 million suspected cases and 3500 associated deaths. Almost one third have been in children under 5, including 711 associated deaths. The outbreak of cholera in Yemen remains the largest in the world. MEH

The Reichstag, Berlin


Sven Przepiorka

Global Health Hub

Germany has embarked on an ambitious initiative to digitize healthcare nationally and internationally with the broad aim of helping to promote the sustainability goals of the UN Agenda 2030. *Middle East Health* reports.

Together with 200 partners from health organizations, foundations, non-governmental organizations, science and academia, and the healthcare industry, the German Federal Minister of Health, Jens Spahn, has launched an initiative to promote the digitalisation of healthcare internationally and create a network to combat disease and advance prevention projects worldwide.

The project is guided by the sustainability goals of the United Nations Agenda 2030, which call for increased interdisciplinary exchange and closer cooperation between different sectors.

At the launch event in February in Berlin, Spahn suggested that the "Global Health Hub Germany" initially address tropical diseases, cancer and digitization.

Speaking at the launch event in Berlin, Spahn said: "With the creation of the Global Health Hub, Germany assumes its responsibility for improving healthcare worldwide.

"Germany must leverage its strength and competence to provide effective assistance. Quality healthcare does not stop at national borders," said Spahn.

"In this network, we will join our forces to move forward in our fight against tropical diseases, cancer and antibiotic resistance.

"We also intend to advance the digitization of healthcare provision internationally. Germany must leverage its strength and competence to provide effective assistance. Quality healthcare does not stop at national borders," said Spahn.

Over a period of three years (2019–2021), the Federal Ministry of Health will support the Global Health Hub Germany by means of seed funding. The Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ) will serve as the network's managing office for this period of time, assuming the necessary coordination tasks.

At the event as a token of initiation, Spahn announced that €1.5 million in funding will be awarded in support of the

Jens Spahn, Federal Minister of Health, Germany

World Health Organization's Expanded Special Project for Elimination of Neglected Tropical Diseases (ESPEN).

Berlin World Health Summit

Speaking at the Berlin World Health Summit in October last year, when the idea of the Hub was initially announced, Spahn said referring to the ambitious 2030 Sustainable Development Goals, that it is "becoming clear that we are falling behind in achieving SDG 3, namely ensure healthy lives and promote well-being for all at all ages."

"Today global health is as fragmented as never before," Spahn said.

"Global health is characterised by a confusing multitude of factors that often work parallel to each other."

Health Policy Watch, quoted him as saying that even with regard to the main international health organisations there is a large number, from WHO to UNAIDS, the World Bank, the Global Fund for AIDS, Tuberculosis and Malaria, Gavi the Vaccine Alliance, and many other relevant organisations.

"If you want to ensure the full implementation of the health-related SDG, leaving no one behind, we need a clear and coherent plan. We need to know who is in the lead in order to avoid duplication and chaos and ensure efficiency."

The only legitimate organisation to take up the lead function is the WHO, Spahn emphasised , adding that the UN health agency needed more stable funding.

Commenting on the initiative, HealthIT News quoted Hans-Peter Bursig, medical engineering managing director at German electronic industry association ZVEI as saying: "Using digital and mobile technologies to provide integrated care workflows, for issues such as for chronic disease, could provide innovative solutions for global health challenges.

"Through telemedicine, medical knowledge can be made accessible over long distances and improve healthcare in large geographical areas, meaning a limited number of centres of excellence can provide expert knowledge and guidance for a large number of people."

on the WEB Global Health Hub Germany
www.globalhealthhub.de

Tiny lensless endoscope captures 3D images of objects smaller than a cell

Researchers from Technische Univeritat (TU) Dresden in Germany have developed a new ultrathin lensless endoscope for biomedical applications. Their work demonstrates that the endoscope, only 200 microns in diameter, can self-calibrate and adjust its focus to perform 3D imaging. Researchers have developed a new self-calibrating endoscope that produces 3D images of objects smaller than a single cell. Without a lens or any optical, electrical or mechanical components, the tip of the endoscope measures just 200 microns across, about the width of a few human hairs twisted together.

As a minimally invasive tool for imaging features inside living tissues, the extremely thin endoscope could enable a variety of research and medical applications.

According to Juergen W. Czarske, Director and C4-Professor at TU Dresden, Germany and lead author on the paper: "The lensless fibre endoscope is approximately the size of a needle, allowing it to have minimally invasive access and high-contrast imaging as well as stimulation with a robust calibration against bending or twisting of the fibre." The endoscope is likely to be especially useful for optogenetics – research approaches that use light to stimulate cellular activity. It also could prove useful for monitoring cells and tissues during medical procedures as well as for technical inspections.

A self-calibrating system

Conventional endoscopes use cameras and lights to capture images inside the body. In recent years researchers have developed alternative ways to capture images through optical fibres, eliminating the need for bulky cameras and other bulky components, allowing for significantly thinner endoscopes.

Global Health Talk

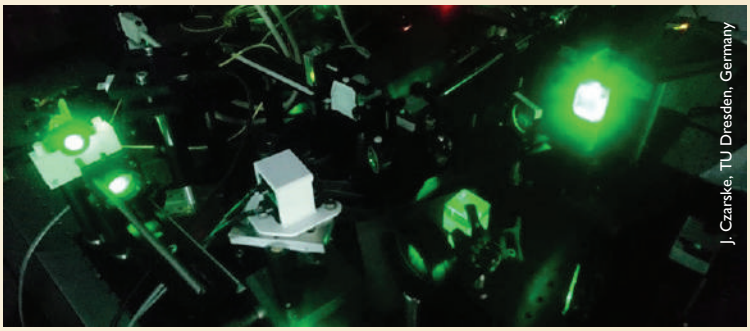
Global Health Hub's first event in June – the Global Health Talk hosted at the state representation of Baden-Württemberg in Berlin – was led by a panel discussion which focused on fighting antimicrobial resistance, harnessing the potential of increasing digitization, as well as combating and preventing non-communicable diseases and neglected tropical diseases. The panellists from science, civil society and youth discussed, among other things, the importance of intersectoral and cross-actor cooperation in addressing these issues and the extent to which the Hub can contribute to this.

The event provided a forum for exchange and networking for a large number of

Despite their promise, however, these technologies suffer from limitations such as an inability to tolerate temperature fluctuations or bending and twisting of the fibre.

A major hurdle to making these technologies practical is that they require complicated calibration processes, in many cases while the fibre is collecting images. To address this, the researchers added a thin glass plate, just 150 microns thick, to the tip of a coherent fibre bundle, a type of optical fibre that is commonly used in endoscopy applications. The coherent fibre bundle used in the experiment was about 350 microns wide and consisted of 10,000 cores.

When the central fibre core is illuminated, it emits a beam that is reflected back into the fibre bundle and serves as a virtual guide star for measuring how the light is being transmitted, known as the optical transfer function. The optical transfer function provides crucial data the system uses to calibrate itself on the fly.


J. Czarske, TU Dresden, Germany

Keeping the view in focus

A key component of the new setup is a spatial light modulator, which is used to manipulate the direction of the light and enable remote focusing. The spatial light modulator compensates the optical transfer function and images onto the fibre bundle. The back-reflected light from the fibre bundle is captured on the camera and superposed with a reference wave to measure the light's phase.

The position of the virtual guide star determines the instrument's focus, with a minimal focus diameter of approximately one micron. The researchers used an adaptive lens and a 2D galvometer mirror to shift the focus and enable scanning at different depths.

Demonstrating 3D imaging

The team tested their device by using it to image a 3D specimen under a 140-micron thick cover slip. Scanning the image plane in 13 steps over 400 microns with an image rate of 4 cycles per second, the device successfully imaged particles at the top and bottom of the 3D specimen. However, its focus deteriorated as the galvometer mirror's angle increased. The researchers suggest future work could address this limitation. In addition, using a galvometer scanner with a higher frame rate could allow faster image acquisition.

"The novel approach enables both real-time calibration and imaging with minimal invasiveness, important for in-situ 3D imaging, lab-on-a-chip-based mechanical cell manipulation, deep tissue in vivo optogenetics, and key-hole technical inspections," said Czarske.

members and interested people from diverse sectors and stakeholder groups, according to a report issued by the Hub. The participants were also able to introduce their own topics and initiate working groups.

At the opening talk of the two-day event, Prof. Dr. Till Bärnighausen (Institute of Public Health, University of Heidelberg) who is co-chair of the interim steering committee of the Global Health Hub Germany (GHHG) along with Tanya Herfurth (Young Leaders for Health e.V.), said: "The great opportunity and special feature of the hub lies in the dialogue and cooperation across different sectors and stakeholder groups",

Speaking at the event, Dr. Johanna Hanefeld (Head of the Berlin branch office of the London School of Hygiene and Tropical Medicine), said: "A cooperation between different sectors and stakeholders is needed in order to work successfully on various important topics of global health. The successful fight against antimicrobial resistance requires intersectoral collaboration, like it is now emerging in the GHHG."

Prof. Dr. Ilona Kickbusch (Director of the Global Health Program at the Graduate Institute of International and Development Studies in Geneva) said a the event: "The Hub is not a structure that has the responsibility to deliver. It is a structure that enables."

Young Leaders for Health

Young Leaders for Health aims to hold an interdisciplinary platform for the exchange of knowledge and the opportunity to network with people across the globe involved in Global Health.

Our greater objective is to encourage and foster potential leaders in Global Health on an interdisciplinary, intercultural and innovative basis.

We offer a participatory stage for the deployment of innovative projects addressing Global Health, which not only aim to strengthen the transfer of knowledge but also aim to generate solutions to diverse subject matters.

Accruing resolutions are then published. Sharing our thoughts with a broader audience, we hope to stimulate social change by providing thought-provoking impulse.
www.youngleadersforhealth.org

A bed for all hospital units

The many looks of the Evario hospital bed

Hospital beds are expected to meet a broad range of requirements. The tasks they face in various hospital units are so wide-ranging that you could be forgiven for thinking the answer is to use a variety of special-purpose models. But wouldn't it be more user-friendly and cost-effective to have one model of bed meeting every need? This is precisely the approach taken by Stiegelmeyer in developing the Evario.

Thanks to its modular system, the Evario can be configured to meet the requirements of different hospital units. Customers can choose between control options, safety side systems, castors and head and footboards to create a flexible custom-made bed for each unit, from general wards and ICUs to premium rooms. In all units, the Evario relieves care staff with effortless operation and a large height adjustment range from 32 up to 91 cm. At the same time its clear design and optional suitability for automated reprocessing provide excellent hygiene characteristics to support the fight against multidrug-resistant pathogens.

The optional integrated scales allow the patient to be accurately weighed and aid the diagnosis and medication. The weight is shown on an easy-to-use handset with a 2,4" back-lit display and well visible buttons. The auto compensation feature allows staff to add or remove items from the bed without affecting the displayed weight of the patient. Besides the weighing feature, the system also optionally provides an integrated Out-of-Bed function which can switch on the underbed light and can be connected to the hospital's nurse-call system. Thanks to the load cells in the chassis, the Out-of-Bed system can inform nursing staff when a patient gets up and does not return to bed in an individually set time frame.

The three-quarter safety sides cover a large part along the mattress base and offer high safety. They are space-saving, visually discreet and provide the patient with an unobstructed view. Care staff can operate these safety sides quickly and intuitively with just one hand. With the optional Protega safety side, Stiegelmeyer offers another great alternative that can be adjusted to meet the individual needs of every patient. The wing-shaped split safety sides, made of high-strength plastic, can be raised only at the head end or along the bed's whole length. The wings can be released with just one move and lower in a damped and quiet way while needing only minimal space. The elements along the head end move along when the backrest is adjusted and thus also protect the patient in an upright sitting position.

When equipped with the Protega safety sides, the Evario can also be optionally fitted with integrated control panels on both sides of the bed's head end. The inner face offers the patient an intuitive choice of basic adjustments while the outer face with its large display enables staff to choose between separated control levels for nurses and technicians. An especially practical feature for care staff are the three preset backrest positions that are often needed in everyday care. On demand, Evario can also be equipped with a fixed headboard that does not move along during height adjustment. Thus, possible damages to the room furnishings are prevented.

- For more information, *visit: www.stiegelmeyer.com* MEH

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Quado

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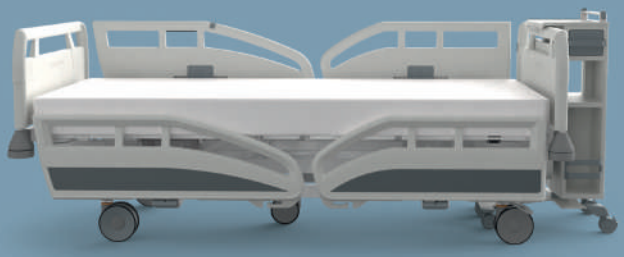

- Two open compartments and a pull-out drawer on both sides provide ample storage space.
- With its neutral color scheme, the Quado adapts to the room design and every hospital bed.
- If the overbed table is not used, it can be folded down in a simple and damped way.
- The Quado can be transported together with Stiegelmeyer beds by attaching it to the head or footboard.

stiegelmeyer.com

STIEGELMEYER

A new chapter for the Berlin Institute of Health

On July 10, 2019, the German Research Minister Anja Karliczek and the Governing Mayor of Berlin Michael Müller signed an administrative agreement on the integration of the BIH into Charité.

On Wednesday, July 10, 2019, German Research Minister Anja Karliczek and Governing Mayor of Berlin Michael Müller signed an administrative agreement between the federal government and the state of Berlin that lays out the details for the integration of the Berlin Institute of Health (BIH) into Charité € University of Medicine, Berlin. The BIH is to become – alongside patient care and the medical faculty – the third pillar of Charité. For the first time, the federal government is directly contributing to the long-term core funding of a university hospital €thus breaking new ground in terms of scientific policy. The Max Delbrück Center for Molecular Medicine in the Helmholtz Association (MDC) will now be a privileged partner of the BIH.

Professor Axel Radlach Pries, interim Chairman of the BIH Executive Board and also Dean of Charité, is pleased that the federal states have approved the integration of the BIH into Charité. "I firmly believe, like Governing Mayor Michael Müller, that this is a good day for patients in Berlin and across Germany," said Pries. "For this will allow us to fulfil even better our mission of transferring research findings from the laboratory into clinical practice – what is known as translation."

He stressed that the BIH has already had some notable successes: "With 26 appointed professors and 20 visiting scientists, who altogether have published over 1,000 scientific papers, the BIH has a glowing track record in the short time since its establishment.

"Our BIH Chairs are responsible for running highly innovative centers that are advancing the digitization of medicine, increasing the effectiveness of clinical trials, and raising the quality of biomedical research. The BIH Biomedical Innovation Academy has already trained more than 100 clinical research physicians, and the BIH Digital Health Accelerator has helped bring the digital ideas of six teams to market. In addition, the BIH has set up scientific infrastructure such as 12 core facilities that support translational research, the primary mission of the Institute.

Professor Karl Max Einhäupl, Chairman of the Executive Board of Charité, expressed his thanks to everyone who made this step possible: "The broad approval from the federal government and the 16 states is an outstanding affirmation of the BIH's efforts to establish itself as a new model of translational medicine, one dedicated to quickly bringing basic research discoveries to the bedside. The BIH's integration into Charité – while at the same time maintaining a high degree of autonomy – for the first time takes advantage of the possibilities afforded to the federal government by the 2014 amendment to the German Basic Law."

Max Delbrück Center for Molecular Medicine

The administrative agreement makes the Max Delbrück Center for Molecular Medicine in the Helmholtz Association (MDC) into a privileged partner of the BIH. Professor Thomas Sommer, interim Scientific Director of the MDC, said: "We will be able to expedite scientific progress that benefits patients through the already excellent and fruitful collaboration of our researchers with Charité's clinicians. The MDC is a driver of innovation and has state-of-the-art technologies and facilities, some of which have been jointly developed – and are extensively used – by the MDC, Charité, and the BIH. This cooperation must continue, and we are very excited about it."

In a tour of the Clinical Research Unit, which took place during the signing event, its head, Dr. Sein Schmidt, made clear that the integration of the BIH into Charité can already be seen €both spatially and substantively: "Here, BIH scientists, MDC researchers, and Charité physicians are working together under one roof, for example, on the BeLOVE study, in which we are examining 10,000 patients from Berlin who have suffered a vascular event and then following them for ten years. Such vascular events include stroke, heart attack, acute heart failure, renal failure, and type 2 diabetes." In collaboration with colleagues from the MDC, the researchers are seeking to not only better understand the interactions and systemic medical factors that are responsible for the onset of these diseases but also to identify factors that can be used to detect and predict these diseases at an early stage.

After the tour, Professor Petra Reinke, who sits on the BIH Center for Regenerative Therapies' steering committee, presented the case of a 40-year-old patient who had received a kidney transplant four years ago. "The subsequent lifelong monitoring of the immune response is at least as complicated as the surgical procedure," explained the transplantation physician. "If the immune reaction to the transplant is too strong, the new organ will be rejected and destroyed. If the body's defence mechanisms are too strongly inhibited by immunosuppressive drugs, patients may develop severe complications such as infectious, metabolic, or tumour diseases. Reinke and her colleagues solved the problem by isolating and multiplying some of the patient's own immune cells €so-called regulatory T cells – and then infusing them back into the patient. "Following the one-time infusion of her cells, Ms. S. has for the past four years taken only one medication and has experienced virtually no side effects. To her and our great delight, she gave birth to a healthy baby girl two years ago." The BIH has made regenerative medicine a key priority in its strategy and will co-fund the BIH Center for Regenerative Therapies with Charité, each contributing 50 percent of the budget.

The integration of the BIH into Charité is expected to be completed by January 1, 2021. MEH

Integromed and medifa partner to build healthcare facilities of the future

Backed by more than 30 years of experience, Integromed has built a name in the Middle East healthcare industry as one of the top one-stop-shop providers of customised solutions for ORs, ICUs and other areas in the hospital. With their exceptional full-service approach and all in-house-related services, the company takes care of all the project steps, from engineering to installation and beyond.

With more than 120 projects realised in the region, Integromed knows their customers' needs well, making every solution fit exactly to their needs. The results of modular room systems, medical gas installations and integrated solutions for ORs and ICUs are especially outstanding and unique. In addition to the products being made in Germany, the company is also known for their passion for infection control and creating safe and healing environments. This is supported by innovative, software-based equipment, like the first ever smart scrub-up trough and daylight simulating concepts.

To better fulfil their customers' needs in future, Integromed and medifa have joined forces and established a strong partnership in the Middle East.

Together the two German companies intend to become the largest planner, manufacturer and installer of room systems worldwide, providing major benefits for their customers. From only one point of contact, they will receive a complete, functioning solution containing high quality products – which is delivered reliably and on time, and professionally installed.

medifa is an owner-run and internationally active company, which manufactures and sells medical equipment for the turnkey operating room. medifa is the world's largest manufacturer of modular room and door systems, as well as operating table accessories and components. The planning, engineering and production take place exclusively in Germany according to certified national and international quality standards with over 90% own value added.

For modular OR room systems and mobile OR tables of the highest quality, medifa is widely known and has many years of experience. Now, partnering with Integromed, the company is developing into a complete solution provider for turnkey ORs.

medifa and Integromed will present their joint solution at Arab Health 2020 in Dubai. MEH

Why embedding clinical decision support technology in your electronic health record should be a priority

By **Alaa Darwish**
Country Manager - Middle East & Africa,
Wolters Kluwer Health

If you're an executive, clinical leader or IT director in a healthcare organization and are looking to maximize your electronic health record (EHR) investment, embedding a clinical decision support solution (CDS) can provide the answer.

With increased caseloads, regulatory burdens and the implementation of new technologies, clinicians around the world are under more time constraints than ever. For this reason, it is critical that decision support information is quickly and easily accessible in the workflow and along the patient pathway. As most clinician workflow is driven by the EHR it makes sense to embed a CDS solution within this system.

What have we learned from healthcare leaders who have embedded clinical decision support into their hospital's EHR?

Wolters Kluwer conducted a survey of healthcare leaders on the results of embedding links to UpToDate – an evidence-based CDS – into their EHRs and asked them to share the lessons learned. The survey revealed that:

- Embedding a CDS into the EHR can improve the quality of care provided
- Clinicians can access information faster and more efficiently without any disruption to their patient encounter, leading to increased utilization of the EHR
- Having a single sign-in, as opposed to multiple, helped improve the efficiency of clinical workflows.

Chances are you have already made a significant financial and resource investment in your EHR system or are about to make such an investment. You also likely have a CDS resource. By having these two resources work together, you can deliver multiple benefits for your patients, your clinicians and your hospital.

Embedding CDS into the EHR may be one of the few electronic initiatives that saves time and improves efficiency, as well as increasing clinician satisfaction and improving patient outcomes.

What are the benefits of embedding clinical decision support into your EHR?

1. Improved Quality of Care and Patient Outcomes

Clinical and IT leaders report that care quality improves when clinicians have easy access to the medical knowledge they need to make the right decisions at the point of care. CDS resources like UpToDate provide evidence-based treatment, screening and diagnostic recommendations, thus potentially reducing errors and enabling faster access to new practice-changing evidence. By integrating these resources within the clinical workflow, you can help reduce errors, avoid unnecessary tests, accelerate treatment planning, and improve patient experience and outcomes.

2. Increased Efficiency and Productivity

Clinicians cannot afford activities that remove them from the clinical workflow. By embedding a CDS into the EHR, evidence-based information can be accessed within the EHR workflow in one click. When clinicians can rapidly confirm the diagnosis or treatment, they can more quickly and accurately order relevant tests and initiate appropriate treatment sooner.

3. Physician Satisfaction

For busy clinicians, few things are more welcomed and appreciated than solutions that improve patient care while streamlining the clinical workflow. Therefore, it is not surprising that embedding a CDS within the EHR workflow of health systems and clinical practices leads to improved clinician satisfaction. According to a survey of UpToDate users, clinicians report that having UpToDate in their EHR is important to patient care, enhances their satisfaction with the EHR and actually encourages them to use their EHR.1

4. Standardized Care

Healthcare organizations want to standardize the care their patients receive across disciplines and across healthcare sites. Standardization creates care that is coordinated and leads to improved outcomes and lower costs through the reduction of clinical variation. When every care team has immediate and easy access to a consistent set of protocols, recommendations and research, all clinicians are working from a 'single point of truth'.

By making a CDS available in the EHR, all clinical staff can benefit from the best available evidence at the point of care, enabling them to deliver consistent and high-quality care to every patient, every time.

- Wolters Kluwer provides trusted clinical technology and evidence-based solutions that engage clinicians, patients, researchers, students, and the next generation of healthcare providers. Find out more at *www.uptodate.com*

1. UpToDate Internal Clinician Study July 2015 N=2,526. MEH

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Interview

DICOM-integrated printers offer advantages for medical facilities

Middle East Health speaks to **Carine Haddad**, Healthcare Manager - MEIT Region at OKI Europe about the company, their presence in the Middle East and their leading technology in medical printers.

Middle East Health: Please give our readers a bit of background about OKI?

Carrine Haddad: OKI Europe Limited is a division of OKI Data Corporation, a global business-to-business brand dedicated to creating cost-effective, professional in-house printers, applications and services, which are designed to increase the efficiency of today's and tomorrow's businesses.

This year we celebrate our 30th anniversary of our pioneering innovation in digital LED printing technology, which has placed OKI at the forefront of the market in delivering high-definition, eco-friendly printing devices.

With an EMEA-wide network of authorised distributors and dealers, OKI Europe provides complete printing solutions including office printers, wide format printers, medical DICOM embedded printers, graphic art printers , inks, media, software, installation, support, knowledge and training.

Today OKI Europe employs over 500 staff at sales offices and production sites in 15 locations and is represented in 60 countries throughout the EMEA region.

MEH: The printers have integrated DICOM technology. Can you tell us about this and why this is important for medical printers?

CH: DICOM-embedded technology allows printing directly from medical imaging equipment, such as ultrasound, MRI, CT, and x-ray without the need for conversion software or external print servers. This allows healthcare organisations to reduce the likelihood of device technical glitches and obtain unbeatable accuracy by removing the requirement for additional hardware. DICOM imaging enables precision printing when connected directly to the medical equipment streamlining support through a single point of contact. This ultimately results in a lower cost of ownership.

OKI-integrated DICOM printers can connect up to 20 imaging devices with up to 5 printing simultaneously, providing superior "near" diagnostic image quality with DICOM Enhanced (DMe) technology and higher quality mono printing for x-ray and ultrasound.

MEH: What sets your printers apart from the competition?

CH: The healthcare industry is becoming increasingly complex, with providers being asked to deliver quality care, ensure the safety of patients and improve operations at a time when budgets are under pressure. OKI's printers provide the high-quality output of an LED printer in combination with DICOM integration, which ensures the delivery of a sharp images in HD quality for colour and mono prints on a wide range of media – paper, PVC, pre-cut media, label sheets, banners, transparency, and blue film. Being able to print such high resolution quality to paper can also help keep media costs down, as paper is more affordable than film. We also provide excellent after sales support.

OKI's Pro9431DMe is a DICOM printer and prints A4/A3 Colour/Mono

MEH: One of your printers can print posters. Can you tell us about this and why this is useful.

CH: OKI printers can print on paper stock ranging from 64 to 260 gsm and it can print on banners and posters up to 1.3 metres in length

For example, orthopaedic images can be printed with OKI's DICOM Media Image A3 banner format, which provides a life-size print.

MEH: Who is your main target market in the Middle East?

CH: OKI's DICOM embedded printers are advantageous for a variety of healthcare organisations. For example, we do business with: Corporate hospitals; diagnostic centres; individual clinics with facilities such as x-ray, ultrasound and pathology; private, stand-alone hospitals and nursing homes; university hospitals; and veterinary practices. So our market incorporates all healthcare sectors across the region. MEH

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Wyss Institute at Harvard University

Walk *and* run more easily with this new lightweight exosuit

A versatile, portable exosuit that assists both walking and running highlights the potential for lightweight and non-restrictive wearable robots outside the lab. **Benjamin Boettner** reports.

Between walking at a leisurely pace and running for your life, human gaits can cover a wide range of speeds. Typically, we choose the gait that allows us to consume the least amount of energy at a given speed. For example, at low speeds, the metabolic rate of walking is lower than that of running in a slow jog; *vice versa* at high speeds, the metabolic rate of running is lower than that of speed walking.

Researchers in academic and industry labs have previously developed robotic devices for rehabilitation and other areas of life that can either assist walking or running, but no untethered portable device could efficiently do both. Assisting walking and running with a single device is challenging because of the fundamentally different biomechanics of the two gaits. However, both gaits have in common an extension of the hip joint, which starts around the time when the foot comes in contact with the ground and requires considerable energy for propelling the body forward.

As reported August 15, 2019 in *Science*, a team of researchers at the Harvard John A. Paulson School of Engineering and Applied Sciences (SEAS), Wyss Institute for Biologically Inspired Engineering, and the University of Nebraska Omaha has developed a portable exosuit that assists with gait-specific hip extension during both walking and running. Their lightweight exosuit is made of textile components worn at the waist and thighs, and a mobile actuation system attached to the lower back which is controlled by an algorithm that can robustly detect the transition from walking to running and vice versa.

The team first showed that the exosuit worn by users in treadmill-based indoor tests, on average, reduced their metabolic rates of walking by 9.3% and of running by

4% compared to when they were walking and running without the device.

"We were excited to see that the device also performed well during uphill walking, at different running speeds and during overground testing outside, which showed the versatility of the system," said Professor Conor Walsh, who led the study.

Walsh is the Gordon McKay Professor of Engineering and Applied Sciences at SEAS, a Core Faculty member of the Wyss Institute, and Founder of the Harvard Biodesign Lab.

"While the metabolic reductions we found are modest, our study demonstrates that it is possible to have a portable wearable robot assist more than just a single activity, helping to pave the way for these systems to become ubiquitous in our lives," said Prof Walsh.

The hip exosuit was developed as part of the Defense Advanced Research Projects Agency (DARPA)'s former Warrior Web program and is the culmination of years of research and optimization of the soft exosuit technology by the team. A previous multi-joint exosuit developed by the team could assist both the hip and ankle during walking, and a medical version of the exosuit aimed at improving gait rehabilitation for stroke survivors is now commercially available in the US and Europe, *via* a collaboration with ReWalk Robotics.

Simpler and lighter

The team's most recent hip-assisting exosuit is designed to be simpler and lighter weight compared to their past multi-joint exosuit. It assists the wearer via a cable actuation system. The actuation cables apply a tensile force between the waist belt and thigh wraps to generate an external extension torque at the hip joint that works in concert with the gluteal muscles. The device weighs 5kg in total with more than 90% of its weight located close to the body's centre of mass.

"This approach to concentrating the weight, combined with the flexible apparel interface minimizes the energetic burden and movement restriction to the wearer," said co-first-author Jinsoo Kim, a SEAS graduate student in Prof. Walsh's group. "This is important for walking, but even more so for running as the limbs move back and forth much faster." Kim shared the first-authorship with Giuk Lee, a former postdoctoral fellow on Prof. Walsh's team and now Assistant Professor at Chung-Ang University in Seoul, South Korea.

Challenge

A major challenge the team had to solve was that the exosuit needed to be able to distinguish between walking and running gaits and change its actuation profiles accordingly with the right amount of assistance provided at the right time of the gait cycle.

To explain the different kinetics during the gait cycles, biomechanists often compare walking to the motions of an inverted pendulum and running to the motions of a spring-mass system. During walking, the body's centre of mass moves upward after heel-strike, then reaches maximum height at the middle of the stance phase to descend towards the end of the stance phase. In running, the movement of the centre of mass is opposite. It descends towards a minimum height at the middle of the stance phase and then moves upward towards push-off.

"We took advantage of these biomechanical insights to develop our biologically inspired gait classification algorithm that can robustly and reliably detect a transition from one gait to the other by monitoring the acceleration of an individual's centre of mass with sensors that are attached to the body," said co-corresponding author Philippe Malcolm, Assistant Professor at University of Nebraska Omaha. "Once a gait transition is detected, the exosuit automatically adjusts the timing of its actuation profile to assist the other gait, as we demonstrated by its ability to reduce metabolic oxygen consumption in wearers."

In ongoing work, the team is focused on optimizing all aspects of the technology, including further reducing weight, individualizing assistance and improving ease of use.

"It is very satisfying to see how far our approach has come," said Prof. Walsh, "and we are excited to continue to apply it to a range of applications, including assisting those with gait impairments, industry workers at risk of injury performing physically strenuous tasks, or recreational weekend warriors."

While the metabolic reductions we found are modest, our study demonstrates that it is possible to have a portable wearable robot assist more than just a single activity, helping to pave the way for these systems to become ubiquitous in our lives.

"This breakthrough study coming out of the Wyss Institute's Bioinspired Soft Robotics platform gives us a glimpse into a future where wearable robotic devices can improve the lives of the healthy, as well as serve those with injuries or in need of rehabilitation," said Wyss Institute Founding Director Donald Ingber, who is also Professor of Bioengineering at SEAS and the Judah Folkman Professor of Vascular Biology at HMS, the Vascular Biology Program at Boston Children's Hospital.

Other authors on the study are past and present members of Prof. Walsh's team, including data analyst Roman Heimgartner; Research Fellow Dheepak Arumukhom Revi; Control Engineer Nikos Karavas, Ph.D.; Functional Apparel Designer Danielle Nathanson; Robotics Engineer Ignacio Galiana, Ph.D.; Robotics Engineer Asa Eckert-Erdheim; Electromechanical Engineer Patrick Murphy; Engineer David Perry; Software Engineer Nicolas Menard, and graduate student Dabin Kim Choe. The study was funded by the Defense Advanced Research Projects Agency's Warrior Web Program, the National Science Foundation and Harvard's Wyss Institute for Biologically Inspired Engineering. MEH

Hand surgery changes young man's life

For most of his first 20 years, Michael Jankowiak never played ball or even owned a toy. His debilitating cerebral palsy wadded his fingers into a tight fist. He barely moved his hands, except to drive his electric wheelchair.

Then, during a visit to his neurologist at Cook Children's, everything changed. Fernando Acosta Jr., M.D., told Michael's mother, Lynn, about a surgeon who could possibly make a big difference in her son's life.

He told her Pamela Sherman, M.D., performed a special type of surgery on children with disabilities. The goal was to help patients with significant contractures (the permanent tightening of muscles, tendons, ligaments or skin) to clean the palms of their hands and improve their hygiene.

But the side effects were, as Lynn puts it, "pretty remarkable."

Patients who need this surgery often demonstrate limited function with the contracted limb preoperatively. The surgery's focus? To help prevent skin deterioration in the palms and elbows, as well as make nursing care, dressing and bathing easier.

"Placing the upper extremity in a more functional position and releasing contractures often has a wonderful added benefit," Dr. Sherman said. "Suddenly, the patient has a hand that they are able to use to push a wheelchair control, use a communication board or hold an object. A little goes a very long way for them."

For Michael, the procedure was life-changing.

"This surgery has given him something new with his life," Lynn said. "He has never been able to find a toy that he could play with. He can now even hold the ball and drops it for the dogs to play with him."

For the first time since he was a baby, Michael, who is now 24, can open his left hand and play with a toy. Michael can even hold his own glass and bring it to his mouth to take a drink.

After receiving a second surgery on his right hand, Michael can now play on his iPad.

"I don't think he cares what he is watching near as much as just having the control of changing videos," Lynn said. "It would be my wish that every child with contracted hands could have the opportunity to have this surgery."

What may have seemed so routine to most families has been nothing short of a miracle to Lynn because of how far her son has come.

Lynn described her first few months after she learned Michael had cerebral palsy as "fuzzy." She lived in a terrified blur of emotions and cried for that first year.

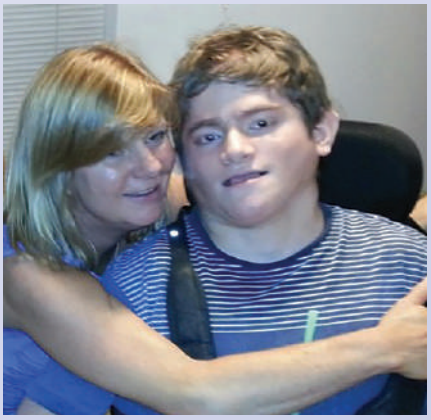
But through her tears, Lynn kept her resolve, beginning with one decision – Michael would be transferred from their home in Abilene to be treated at Cook Children's in Fort Worth, Texas.

"To see your baby crawling, trying to learn to walk and then all of a sudden he's not moving, was horrible," Lynn said. "If he had not gotten transferred, Michael would not be alive. I believe that with all my heart. I would not go anywhere else."

The first month he stayed in the intensive care unit. Since then, Michael was treated in a number of areas at Cook Children's, including Infectious Disease, Neurosciences, Heart Center, Radiology, Surgery and Rehabilitation Services.

And now, after two decades, Lynn still believes Cook Children's works miracles for her son.

"It's really the entire system," Lynn said. "Everybody works so well together. I remember how I felt from the first time I walked in at 2 in the morning. You knew you were going to be treated well and your child was going to be taken care of by everyone."



Michael Jankowiak, following his life-changing treatment at Cook Children's to relieve his debilitating cerebral palsy.

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Case studies show advances in local healthcare

Hospitals in the United Arab Emirates are increasingly performing more complex procedures as the standard of healthcare improves and as they acquire more advanced technology. In this report, *Middle East Health* looks at a selection of case studies from some of the hospitals in the UAE which provides a brief overview of some of their capabilities and serves as an indicator that in many cases local patients now need not have to travel overseas for certain complex medical procedures as they had to do in the past.

Cleveland Clinic Abu Dhabi

Surgeons at Cleveland Clinic Abu Dhabi have installed the UAE's first artificial urinary sphincter to cure incontinence, following life-saving prostate cancer surgery.

The device is the latest in a series of innovations introduced at the hospital to help improve patients' quality of life and a new addition to its range of treatments for cancer patients in recovery.

For the patients with prostate cancer, one of the most effective treatments is to surgically remove the prostate. While this can effectively cure the condition, some patients may experience complications, including urinary incontinence, as a result of damage to the tissue surrounding the prostate.

"Incontinence can destroy a person's confidence, making them retreat into themselves. Offering those prostate cancer patients who experience these complications a cure is important in restoring their dignity. The surgical implant device is another important tool for the wider range of treatment options we are able to offer cancer patients to help their recovery," says Dr Zaki Almallah, the urologist who performed the surgery.

The device, an artificial urinary sphincter, is an implant that uses an inflatable cuff to prevent urine from leaking through the patient's urethra. The opening and closing of the cuff can be controlled using a pump inserted under the skin, so that the patient can press the pump to open the cuff and empty their bladder.

"After I had surgery for my prostate cancer, I realized I could no longer control my bladder. As a relatively young man, I just couldn't accept my new reality. I really felt embarrassed and anxious outside of my home, worrying people might notice," said Salem Al Jaashani. "Since Dr Zaki installed this device, I feel like a new person. I am finally able to enjoy the life I had before my cancer diagnosis."

Thanks to advances in technology and diagnostics, patients are being diagnosed with prostate cancer earlier than ever before. While earlier diagnosis has helped improve outcomes for patients, it has also meant that the possibly life-altering complications arising from the treatment affect people at a younger age.

Dr. Zaki Almallah, urologist at Cleveland Clinic Abu Dhabi

Artificial urinary sphincters have been

Al Ain Hospital: A young girl successfully undergoes an endoscopic procedure to retrieve a pin she swallowed and which settled near her heart.

shown to be highly effective in treating incontinence. A study co-authored by Dr Almallah during his practice in the UK showed that more than 80% of patients who received the implant experienced a total or significant reduction in their incontinence, with a further 19% reporting a good improvement.

"Being able to treat cancer effectively is wonderful, but in addition to saving a person's life, it's important that we can also provide them with a good quality of life afterwards," said Dr Almallah.

Al Ain Hospital

The medical team at Al Ain Hospital, part of Abu Dhabi Health Services Company (SEHA), performed a dangerous procedure to save a 13-year-old girl who swallowed a 2.5 cm pin that settled near her heart.

The young girl accidently swallowed the narrow pin as she was preparing to wear her veil. A series of medical tests and analysis revealed that it landed in one of the lower bronchi of the left lung, adjacent to the heart muscle. The doctors managed to insert an endoscope and successfully remove the pin from the wall of the lung using localized anaesthesia without causing any internal bleeding.

Dr Saber Al-Mishal, Head of the Pulmonology Department, said: "This case was extremely sensitive due to the location of the pin. Our doctors had to carefully remove the pin without touching the heart or puncturing any veins or arteries that may have caused major internal bleeding. Their steady hands and vast intricacy allowed the young girl to leave the hospital the same day of the procedure. The health and safety of our patients is always our number one priority".

The healthy young girl and her family expressed their gratitude for the efforts exerted by the medical team and for the quality care provided by the medical, technical and administrative staff at Al Ain Hospital.

The Pulmonology Department with its advanced laboratory provides many services to diagnose and treat chest pain, asthma, allergies, obstructive sleep apnoea, chronic bronchitis, bronchodilation, lung fibrosis, ascites of the membrane and bronchoscopy, and acute inflammation of the lungs.

Emirates Hospital - Jumeirah

Amna, a 43-year-old female started experiencing poor vision in her right eye a few weeks prior to evaluation. Being a diabetic, she decided to seek medical attention and possible intervention by an expert. On visiting Emirates Hospital – Jumeirah (EHJ) she was referred to an Interventional Cardiologist who diagnosed severe blockages in her right internal carotid artery, hindering the supply of oxygenated blood to the brain. Further assessments confirmed that the artery on her right side of the neck was blocked by approximately 90%.

For such cases, in many hospitals around the world, a surgery called "carotid endarterectomy" is the preferred surgical procedure. It is typically done under general anaesthesia and involves cutting the skin of the neck and surgically opening the artery to remove the occlusive plaque. This invasive surgery by itself can carry a major risk of stroke if not performed by expert hands.

However, Dr Allam Alkowatli, MD, Consultant Interventional Cardiologist and Vascular Interventionalist and the Chief of Cardiovascular Medicine at EHJ, evaluated the patient and recommended a minimally invasive procedure that requires the placement of a special stent in her carotid artery to remove the plaque and lower the risk of imminent stroke in the near future, without performing any major surgery.

The stents selected for such procedures are USA-FDA approved and inserted under fluoroscopy through a tiny opening in the upper thigh using a special tube and filter wire. This helped to open up the

The blockage in the right internal carotid artery is indicated in the right image. The left image shows the same vessel after insertion of the stent.

artery and therefore decreased the chance of it narrowing again.

The procedure was performed at the Interventional Cardiology & Vascular Catheterization Laboratory Suite of EHJ and took less than 30 minutes. It was successful in eliminating the blockage without any complications. The patient was discharged to home in less than 24 hours.

Carotid stenting is a minimally invasive vascular procedure supported by major US and European clinical trials and is recommended by international experts due to its minimally invasive nature and high success rate when performed by an expert. There is no major wound or scar involved with this procedure as it requires only a very small incision in the skin and blood vessel in the groin that heals in five days.

General anaesthesia is not required and the patient is given sedatives during the length of the procedure. However, certain criteria are needed for a patient to be considered fit for this minimally invasive surgery, which includes the ability to take blood thinners for a few weeks following the procedure and they should also have good kidney function.

EHJ is a pioneer in performing such advanced procedures.

Mafraq Hospital

Specialists at Mafraq Hospital, part of Abu Dhabi Health Services Company (SEHA), have successfully replanted a severed hand using world-leading technology and microscopic transplant techniques.

The male patient was transferred to Mafraq hospital immediately after being involved in a workplace accident. The incident created a complicated medical challenge due to multiple crushed bones and the severing of all ligaments, arteries and nerves feeding the hand.

Medical staff at Mafraq completed the complex procedure using microscopic surgery techniques that successfully restored blood flow and hand hydration and reinstated the bones, arteries and ligaments to save the hand.

Dr Muqdad Al-Hammadi, Consultant and Head of Plastic Surgery, Burns and Hand Surgery at Mafraq Hospital, said: "The success of the hand replantation depends on the extent of tissue damage, which is directly impacted by time. Since the patient and his hand arrived at the hospital within seven hours, we were able to safely restore it. In some cases, if an injury takes place and the severed body part is preserved properly in a cold container within two hours, it may be salvaged. This is the seventh case I have conducted at Mafraq Hospital over the last four years."

Mafraq Hospital has a 100% success rate for replantation procedures. Medical professionals attribute this achievement to the use of world class techniques and technology as well as rapid intervention and adherence to clear treatment plans, including intensive physiotherapy to restore function and aid healing.

Dr Al-Hammadi praised the assistant medical team of anaesthesiologists, nurses and Dr Mona Al-Atrash for providing exceptional medical service to ensure the success of the operation. MEH

Mafraq Hospital: The patient shows off his hand which was successfully reattached by Dr Muqdad Al-Hammadi, Consultant and Head of Plastic Surgery, Burns and Hand Surgery, after being severed in a accident.

Interview

Fine Hygienic Holding growing rapidly, looks at new markets in the Middle East

Middle East Health speaks to **James Michael Lafferty**, CEO of Fine Hygienic Holding about the company and its focus on wellness.

Middle East Health: Can you give Middle East Health readers a bit of background about Fine Hygienic Holding?

James Michael Lafferty: Fine Hygienic Holding (FHH) is MENA's market leader in consumer paper. This constitutes tissue paper, toilet paper, and kitchen towels, as well as baby and adult diapers. We are celebrating our 62nd year, and we are dual-HQ in both Amman, Jordan, where we were first founded, and Dubai, UAE.

We employ over 3,500 people across multiple markets, and whilst our business is focused on the MENA region, we actively sell in 75 different countries across the world.

FHH is a company founded on strong values. Doing the right thing and operating with the highest levels of integrity; offering superior products that deliver good value to consumers; taking care of our employees as our single most important asset.

MEH: Focusing on the healthcare industry specifically, what products does the company produce for this market?

JML: In an effort to continually evolve and improve, we have identified "Wellness" as one of the globe's key trends leading to the year 2050. Despite advances in healthcare, we are not seeing an overall improvement in health or life expectancy. Obesity rates are rising. New diseases emerge.

As a result, we have consciously pivoted our company from "just paper products" into a company that helps provide better wellness to our consumers. A pillar of this is hygiene, and hence the name "Hygienic" in our company designation. We have innovated to bring technology into our products that improve wellness. We offer the world's only 100% sterilised tissues. All of our products are fully sterilised coming off the production lines and packaged for our consumers. Our diapers are specially formulated to offer superior skin health to both babies and adults suffering from incontinence. Hygiene and skin protection are key elements of wellness. The skin is, after all, the body's largest organ!

We are leaders not only in the at-home segment, but also away-from-home markets. We specialise in offering tissue products for the healthcare industry. This is crucial for an industry that continually suffers from facility-wide infections like MRSA. Knowing that the hospital or clinic has one less area to worry about – as our paper tissues are 100% sterilised – brings better peace of mind. We have partnered with the Medical Wellness Association, based in the USA and representing global leaders in medicine and wellness, to offer certification programs and training for healthcare facilities to improve their overall sanitation. Using sterilised tissue products, which are available throughout any such facility, is an important part of an overall world-class hygiene standard.

We developed and tested extensively our "Steripro" process, which uses UV technology to render our products germ-free upon packing into the consumer unit. We are also currently in testing with a breakthrough technology which would render the tissue germ-free throughout opening of the pack and in use. This is a revolutionary technology from Switzerland, and we would hope to qualify it and market it by 2020.

MEH: Is the company bringing out any new products aimed at the healthcare sphere?

JML: As wellness is an overall corporate direction, we are actively seeking to expand our portfolio into other areas of wellness, specifically beverages and nutritional supplementation. We are in talks at present to acquire various companies, but at this stage we are unable to comment further. But stay tuned!

MEH: Focusing on the Middle East – are there any social responsibility initiatives that the company is or has been involved with?

JML: We at FHH believe in giving back to the societies we work, live, and play in. Our flagship CSR program – Khair Al Koura – is one we are particularly proud of. This initiative is the first of its kind in the region, one that addresses numerous factors to better the lives of the residents of Al Koura – a community located north of Jordan where Fine is empowering people to help themselves through providing them with income generating opportunities and educational programs.

We also have different initiatives tailored to the needs of each country as well as support a multitude of charities in each of the 4 countries we operate in.

Furthermore, we are currently in negotiations with a leading NGO to offer a pan-MENA program, of unprecedented scope, in which we would donate a portion of our product sales to support underprivileged children and mothers. This will be announced soon.

FHH is on an exciting journey. Our core business is growing at double-digits. We are aggressively expanding into new markets and also into acquiring our way into new categories. The future is bright! MEH

Espeo Software

Unlocking the potential of IoMT: Blockchain and AI solutions

By **Mickael Costache**
Sales Director for Middle East, Africa and Asia, Espeo Software

Since entering the UAE market in 2018, Espeo Software has been watching the surge of the Internet of Medical Things (IoMT) closely. Many tout the myriad benefits IoMT devices have in improving health outcomes. However, a careful approach to these devices is essential. Smart tech solutions to handle larger and larger sets of data and keeping it all secure is vital as wearables and remote monitors proliferate.

Remote sensors are nothing new, of course. Heart monitors have been around for nearly 60 years. But, the difference with the newest generation of medical devices is in the scale of data they collect, process, and transmit. While IoMT devices are playing an increasingly important role in healthcare, data management and security still pose a significant challenge for healthcare companies. Healthcare organizations aiming to leverage IoMT devices need to decide how to handle unstructured data and secure it. As IoMT devices continue to come on the market, emerging technologies such as artificial intelligence and blockchain technology will be the necessary parts that will drive greater healthcare innovation.

Internet of Medical Things

IoMT is a broad term for devices and connected sensors that collect and transmit data to consumer apps or medical professionals. One advantage to doctors is that they give much more detailed insights into patient health history. Continuous monitoring – especially of chronic diseases such as diabetes delivers an unprecedented glimpse into patient health, empowering end-users with vital information about their own health. Doctors can also use this to make better diagnoses.

Numerous studies suggest a feeling of greater control over personal health as a leading factor in user adoption of wearable IoMT devices. This shift may lead to better outcomes and improvements in the quality of care for patients managing their health. It's partly this user buy-in that makes wearables so effective. Connected devices and the data they transmit, however, pose significant challenges for those who collect and store this information. Technological innovations increasingly have a role to play.

Artificial Intelligence

As mentioned earlier, part of what makes IoMT devices so attractive in healthcare is their continuous collection and analysis of health data. Of course, all this unstructured data can be difficult to process. Devices which leverage Artificial Intelligence (AI) can predict diseases automatically or alert users to sudden changes. Looking at the example of diabetes, AI empowered IoMT blood insulin monitors can notify the patient when to act. Doctors, in turn, can use this data to better treat patients with more personalized care.

Recent smart continuous glucose monitors include devices such as Eversense and Freestyle Libre. These devices measure glucose data and send it to smartphone applications. Other devices like GoCap, InPen, and Esysta monitor data and prescribe optimal types and doses of insulin. AI can help automate this and improve IoMT devices.

Blockchain

While artificial intelligence can increasingly handle larger sets of data, blockchain technology is one particularly useful way to secure it. Using blockchain as a security layer makes medical data harder to hack, and therefore less likely that sensitive patient data gets exposed. Many security experts have raised concerns about the security of connected devices, especially when they collect and transmit medical data.

Decentralized consensus eliminates tampering and maintains data integrity. It also securely distributes information to all stakeholders. Finnish company BioMensio, one of Espeo Software's clients uses IoMT devices to test saliva samples for illicit substances. There are significant opportunities for blockchain technology in this regard. It would help the devices secure and seamlessly distribute data to laboratories and law enforcement. Savings in administration and security costs will help healthcare companies shore up profits and help reign in overall healthcare spending.

The UAE market

The UAE is ready for technological innovation as the Emirati healthcare market adapts to an influx of domestic and foreign patients. Demand for more data-driven, patient-centric care can be met with smart implementation of technology. With IoMT devices, artificial intelligence and blockchain technology can be the vital parts to process and also secure medical data these devices collect. As the trend to use more sophisticated devices in healthcare continues, IT solutions need to keep ahead of the trends facing the industry. Espeo Software is happy to be part of this wave of innovation. MEH

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Drug delays type 1 diabetes in people at high risk

NIH-funded study finds immunotherapy slows progression to clinical disease by 2 years or more.

Dorothy Becker, MBBCh, principal investigator for the research team at UPMC Children's Hospital of Pittsburgh working on the Type 1 Diabetes TrialNet study.

A treatment affecting the immune system effectively slowed the progression to clinical type 1 diabetes in high risk individuals, according to findings from National Institutes of Health-funded research. The study is the first to show that clinical type 1 diabetes can be delayed by two or more years among people who are at high risk. These results were recently published online in *The New England Journal of Medicine* and presented at the American Diabetes Association Scientific Sessions in San Francisco.

The study, involving treatment with an anti-CD3 monoclonal antibody (teplizumab), was conducted by Type 1 Diabetes TrialNet, an international collaboration aimed at discovering ways to delay or prevent type 1 diabetes. Researchers enrolled 76 participants ages 8-49 who were relatives of people with type 1 diabetes, had at least two types of diabetes-related autoantibodies (proteins made by the immune system), and abnormal glucose tolerance.

Participants were randomly assigned to either the treatment group, which received a 14-day course of teplizumab, or the control group, which received a placebo. All participants received glucose tolerance tests regularly until the study was completed, or until they developed clinical type 1 diabetes – whichever came first.

During the trial, 72% of people in the control group developed clinical diabetes, compared to only 43% of the teplizumab group. The median time for people in the control group to develop clinical diabetes was just over 24 months, while those who developed clinical diabetes in the treatment group had a median time of 48 months before progressing to diagnosis.

Transformative

"This is pretty transformative in our field," said Dorothy Becker, MBBCh, principal investigator for the research team at UPMC Children's Hospital of Pittsburgh, one of 28 institutions in four countries that participated in the trial. She cautions, "This drug is still investigational and shouldn't be used off label until phase 3 studies have been done."

Other data collected from the trial may help researchers to understand why certain people responded to treatment. Participants who responded to teplizumab tended to have certain autoantibodies and other immune system characteristics. The research team also cautioned that the study had limitations, including the small number of participants, their lack of ethnic diversity, and that all participants were relatives of people with type 1 diabetes, potentially limiting the ability to translate the study broadly.

"While the results are encouraging, more research needs to be done to address the trial's limitations, as well as to fully understand the mechanisms of action, long-term efficacy and safety of the treatment," said Lisa Spain, Ph.D., Project Scientist from the NIH's National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK), sponsor of TrialNet.

"This trial illustrates how decades of research on the biology of type 1 diabetes can lead to promising treatments that have a real impact on people's lives. We're very excited to see the next steps in this research," said Dr. Griffin P. Rodgers, NIDDK Director. "The dedicated researchers, volunteers and families participating in this program make discoveries like this possible."

- Visit *www.chp.edu/endocrinology* for information about the clinical and research activities at UPMC Children's.

About UPMC Children's Hospital of Pittsburgh

Regionally, nationally, and globally, UPMC Children's Hospital of Pittsburgh is a leader in the treatment of childhood conditions and diseases, a pioneer in the development of new and improved therapies, and a top educator of the next generation of pediatricians and pediatric subspecialists. With generous community support, UPMC Children's Hospital has fulfilled this mission since its founding in 1890. UPMC Children's is named consistently to several elite lists of pediatric hospitals, including ranking in nine of the 10 pediatric subspecialties on the prestigious *U.S. News & World Report* annual Honor Roll of America's Best Children's Hospitals for 2019–2020.

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KIMES in Seoul attracts more than 75,000 visitors

New disruptive digital healthcare solutions on show

The 35th Korea International Medical & Hospital Show (KIMES) took place at COEX in Seoul from 14-17 March in 2019. The four-day event saw more than 73,000 visitors from 96 countries pass through the doors, according to the organizer, Korea E & EX Inc.

KIMES serves as an important regional hub and platform for all those involved in the medical and healthcare industries in Asia. It is one of the region's premier medical events. The show grows year on year and this year saw the highest exhibitor and visitor numbers in the event's history. It's first event in 1980 was attended by 23,500 visitors.

This year the theme at KIMES was "Meet the future".

The main aims of KIMES are to provide assistance to further the development of the medical equipment industries in Korea and neighbouring countries, and promote trade in domestic and international markets.

Products on show were from range of categories including: Consultation & Diagnostic Equipment, Central Supply Equipment, Clinical Examination Equipment, Hospital Facilities Equipment, Radiology Equipment, Medical Information System, Surgical Apparatus & Equipment, Oriental Medicine & Equipment, Cure Apparatus & Equipment, Pharmaceutical Equipment, Physiotherapy Apparatus, Cosmetic Dermatology & Healthcare Equipment, Ophthalmic Apparatus, Medical Device Component & Service, Dental Apparatus, Disposable Apparatus and others.

The 2019 event had significant international participation. Of the 1403 exhibitors, beside the 695 Korean manufacturers, there were 129 from the USA, 53 from Japan, 84 from Germany and 185 from China, among others.

Local Korean companies, with a large presence at the event such as Samsung, Listem, DK Medical, BIT Computer, Alpinion – are playing an increasingly important role in healthcare domestically and internationally.

Korean companies also showcased a variety of new disruptive digital healthcare solutions, such as robotic surgery, robotic rehabilitation, 3D printing, IT platforms, wearable devices, smart medicine and healthcare analytics. In Hall D there was a co-exhibition called "MedicomteK 2019" which showcased medical tool development technology encompassing AI, deep learning and robotic science. Providing a space for this co-exhibition reflects the growing interest in high-tech medical equipment parts and materials.

Other global brands such as GE, Philips, Shimadzu and Fuji also exhibited at KIMES.

Along with the exhibition there was conference programme attended by medical professionals from the region. There were 180 seminar sessions held during the event covering topics from government policy on the medical devices market, to new medical device technology and financial tech for doctors. Bidur Dhaul, business head of patient care and monitoring systems, Philips Health Tech, gave the keynote address.

To maximize visitors' convenience and display efficiency, the show was exhibited at four locations in the exhibition centre; (Cure & Medical Information Systems) at A hall 1st floor, (Healthcare & Rehabilitation Equipment Hall) at B/D Halls, Grand Ballroom and the lobby, (Clinical & Diagnosis Equipment Hall) at C hall 3rd floor, and (Imaging, Hospital Facilities) at D hall. There was an additional expansion to Hall E in which Healthcare & Comprehensive Medical Equipment products were exhibited.

Medical Korea 2019

This year, KIMES was combined with Medical Korea 2019. This global medical conference and exhibition is held annually by Korea Health Industry Development Institute. Aimed at exchange of information and expansion of network at home and abroad, the exhibition consists of medical service related shows and 10 session conferences including the global medical market, discovery of new paradigms, the outlook on the global partnership in medical education, finding new service strategies for foreigners, exploration of new markets and digital healthcare strategies, online marketing trends in medical service, and innovation of medical and wellness tourism.

This year's event was sponsored by:

- Ministry of Trade, Industry and Energy
- Ministry of Health & Welfare
- Ministry of Food & Drug Safety
- Seoul Metropolitan Government
- Korea Trade-Investment Promotion Agency (KOTRA)
- Korea Health Industry Development Institute
- Korean Medical Association
- Korean Hospital Association
- Korean Medical Women's Association
- Korean Nurses Association
- Korea Medical Devices Distribution Association
- Korea Medical Engineering Association
- Korean Medical News

Special events

There were several special events held at KIMES 2019, including a scholarship contribution. The organisers commented: "Wishing to contribute to the health care industry through finding talented student and to foster the upcoming generations, we started to offer "KIMES Scholarships" to young students whose college major is in biomedical engineering from 2014."

- For more information, visit: *www.kimes.kr* or email: *kimes@kimes.kr* MEH

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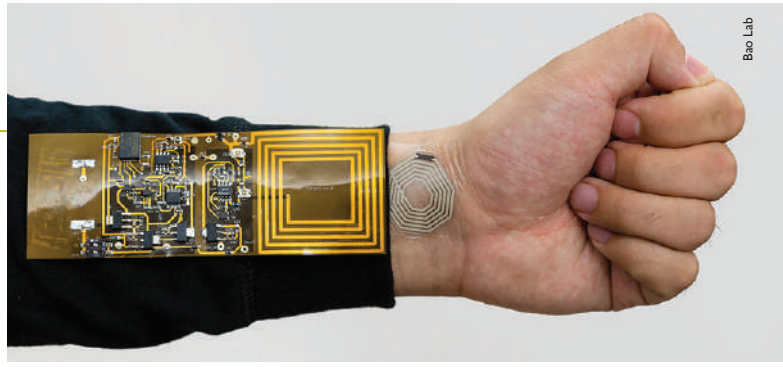
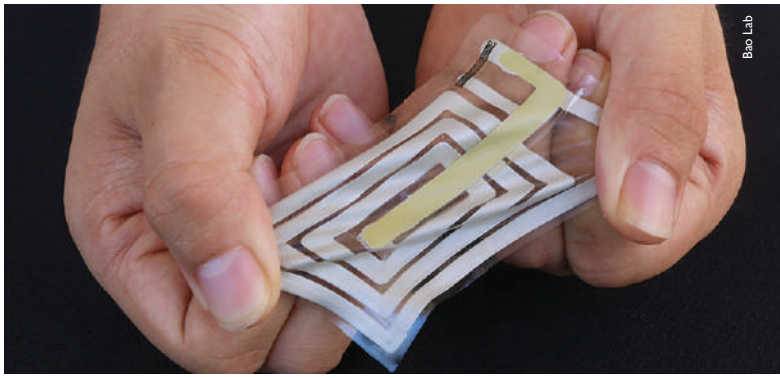
Wednesday - Thursday
25-26 September 2019
10h00 - 18h00

Friday
27 September 2019
10h00 - 17h00

Stanford engineers develop wireless sensors that stick to the skin to track health



The rubber sticker attached to the wrist can bend and stretch as the person's skin moves, beaming pulse readings to a receiver clipped to the person's clothing.



Using metallic ink, researchers screen-print an antenna and sensor onto a stretchable sticker designed to adhere to skin and track pulse and other health indicators, and beam these readings to a receiver on a person's clothing.

Stanford engineers have developed experimental stickers that pick up physiological signals emanating from the skin, then wirelessly beam these health readings to a receiver clipped onto clothing. It's all part of a system called BodyNet. **Tom Abate** reports.

We tend to take our skin's protective function for granted, ignoring its other roles in signalling subtleties like a fluttering heart or a flush of embarrassment.

Now, Stanford engineers have developed a way to detect physiological signals emanating from the skin with sensors that stick like band-aids and beam wireless readings to a receiver clipped onto clothing.

To demonstrate this wearable technology, the researchers stuck sensors to the wrist and abdomen of one test subject to monitor the person's pulse and respiration by detecting how their skin stretched and contracted with each heartbeat or breath. Likewise, stickers on the person's elbows and knees tracked arm and leg motions by gauging the minute tightening or relaxation of the skin each time the corresponding muscle flexed.

Zhenan Bao, the chemical engineering professor whose lab described the system in an Aug. 15 article in Nature Electronics, thinks this wearable technology, which they call BodyNet, will first be used in medical settings such as monitoring patients with sleep disorders or heart conditions. Her lab is already trying to develop new stickers to sense sweat and other secretions to track variables such as body temperature and stress. Her ultimate goal is to create an array of wireless sensors that stick to the skin and work in conjunction with smart clothing to more accurately track a wider variety of health indicators than the smart phones or watches consumers use today.

"We think one day it will be possible to create a full-body skin-sensor array to collect physiological data without interfering with a person's normal behaviour," said Bao, who is also the K.K. Lee Professor in the School of Engineering.

Stretchable, comfortable, functional

Postdoctoral scholars Simiao Niu and Naoji Matsuhisa led the 14-person team that spent three years designing the sensors. Their goal was to develop a technology that would be comfortable to wear and have no batteries or rigid circuits to prevent the stickers from stretching and contracting with the skin.

Their eventual design met these parameters with a variation of the RFID – radio-frequency identification – technology used to control keyless entry to locked rooms. When a person holds an ID card up to an RFID receiver, an antenna in the ID card harvests a tiny bit of RFID energy from the receiver and uses this to generate a code that it then beams back to the receiver.

The rubber sticker attached to the wrist can bend and stretch as the person's skin moves, beaming pulse readings to a receiver clipped to the person's clothing. (Image credit: Bao Lab)

The BodyNet sticker is similar to the ID card: It has an antenna that harvests a bit of the incoming RFID energy from a receiver on the clothing to power its sensors. It then takes readings from the skin and beams them back to the nearby receiver.

But to make the wireless sticker work, the researchers had to create an antenna that could stretch and bend like skin. They did this by screen-printing metallic ink on a rubber sticker. However, whenever the antenna bent or stretched, those movements made its signal too weak and unstable to be useful.

To get around this problem, the Stanford researchers developed a new type of RFID system that could beam strong and accurate signals to the receiver despite constant fluctuations. The battery-powered receiver then uses Bluetooth to periodically upload data from the stickers to a smartphone, computer or other permanent storage system.

The initial version of the stickers relied on tiny motion sensors to take respiration and pulse readings. The researchers are now studying how to integrate sweat, temperature and other sensors into their antenna systems.

To move their technology beyond clinical applications and into consumer-friendly devices, the researchers need to overcome another challenge – keeping the sensor and receiver close to each other. In their experiments, the researchers clipped a receiver on clothing just above each sensor. One-to-one pairings of sensors and receivers would be fine in medical monitoring, but to create a BodyNet that someone could wear while exercising, antennas would have to be woven into clothing to receive and transmit signals no matter where a person sticks a sensor.

• **doi**: 10.1038/s41928-019-0286-2 MEH

Agenda

Selected schedule of regional medical meetings, conferences and exhibitions

Event	Date / City	Contact
■ September 2019		
5th Abu Dhabi International Conference in Dermatology and Aesthetics (AIDA)	19-21 September 2019 Abu Dhabi, UAE	https://go.evvnt.com/407453-0
The 5th Annual MENA International Orthopaedic Congress	19-21 September 2019 Dubai, UAE	https://go.evvnt.com/349042-0
2nd Emirates Pediatric Hematology & Oncology Conference"	20 September 2019 Abu Dhabi, UAE	http://menaconference.com/events/ephoc2/
8th SEHA International Nursing, Midwifery and Allied Health Conference	24-26 September 2019 Abu Dhabi, UAE	http://menaconference.com/events/sinmac/
■ October 2019		
The 5TH MENA Health insurance congress	1-3 October 2019 Dubai, UAE	https://go.evvnt.com/430242-0
AHIMA World Congress Healthcare Information Summit	3-5 October 2019 Abu Dhabi, UAE	https://www.awc.world/summit-2019/
3rd Abu Dhabi Ambulatory Healthcare International Congress	16-19 October 2019 Abu Dhabi, UAE	http://www.adahic.ae/
The Abu Dhabi ID Week	16-20 October 2019 Abu Dhabi, UAE	https://go.evvnt.com/378477-0
The 6th Annual GCC Pharmacy Congress	24-26 October 2019 Dubai, UAE	https://go.evvnt.com/445220-2
XXIV World Congress of Neurology - WCN 2019	27-31 October 2019 Dubai, UAE	https://go.evvnt.com/323182-5
3rd International Conference on Prevention and Control of Infection	31 October - 2 Nov 2019 Abu Dhabi, UAE	http://menaconference.com/events/3icpci/
■ November 2019		
The 5th Annual International Paediatric & Neonatal Medical Congress	14-16 November 2019 Dubai, UAE	https://go.evvnt.com/449240-0
7th International Oncology Conference	29-30 November 2019 Abu Dhabi, UAE	http://menaconference.com/events/7ioc/

List your conference:
If you have upcoming conference/exhibition details which you would like to list in the agenda, please email the details to the editor: editor@MiddleEastHealthMag.com

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Giving new hope to children with metabolic disease

UPMC Children's Hospital of Pittsburgh is a leading international center for liver transplantation as a treatment for metabolic disease.

As one of the best children's hospitals in the United States, as named by U.S. News & World Report, UPMC Children's Hospital of Pittsburgh is a pioneer in the field of liver transplantation, which has proven to be a life-changing solution for patients with metabolic disease.

Liver transplantation can dramatically reduce symptoms, and in cases like maple syrup urine disease (MSUD), can provide a cure.

Liver transplantation is more than a life-saving procedure; it's also an attractive approach for improving quality of life for many patients with metabolic disease. In 2004, we developed the protocol for liver transplantation for MSUD. Today, we've performed more transplants on patients with MSUD than any other center in the world. That's more than 70 patients with a 100-percent survival rate. All of these patients show normal liver function, have avoided the risk of neurological complications, and enjoy an unrestricted diet.

We've performed more liver transplants for patients with metabolic disease than any other transplant center.

Since the inception of our program in 1981, our world-renowned experts have performed more than 1,700 liver transplants – that's more than any other center in the United States – with survival rates that exceed national averages. Additionally, we've performed more than 330 liver transplants for patients with metabolic disease, which is more than any other center, including adult facilities. Also, we're leaders in living-donor liver transplants, which eliminate wait times for a deceased donor and can provide excellent outcomes.

Find out more about our excellent outcomes and extraordinary care.

Our experience, expertise, and commitment to innovation and compassionate care are reasons why patients and families from around the world travel to UPMC Children's Hospital of Pittsburgh. For a free phone consultation with one of our experts in liver transplantation as a therapeutic option for metabolic disease, please visit **www.chp.edu/metabolic** or send an email to **international@chp.edu**.

UPMC | CHILDREN'S HOSPITAL OF PITTSBURGH

Source: Internal data, Hillman Center for Pediatric Transplantation