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Qatar ahead of the curve in move to incorporate private-sector funding

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Syria crisis

More people now die from lack of healthcare than from conflict

In the News:

- Stem cell treatment trial for MS patients shows some 'miraculous' results
- Scientists discover viral 'enigma machine'
- Organs-on-a-chip goes on display in New York's Museum of Modern Art

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Prognosis

Electronic health data

While doctors in India deliver medical diagnoses via Whats App, smartphone apps are used for medical imaging, and electronic health records become the norm, information technology is being fine-tuned in every area of healthcare delivery. However, as with all digital information that must be kept private, security is key. This is no less so with digital healthcare information, where online privacy is historically protected by the Hippocratic Oath to preserve the all-important doctor-patient confidentiality. With the rapid development and adoption of numerous competing healthcare IT systems there are bound to be some failures in the protection of data. This is made clear by the global media regularly publishing stories of leaked data and hacked information systems. Read our report in healthcare information and data security on page 62.

Healthcare funding is a complex issue, but one thing is clear – it is a growing financial burden on governments which try to provide affordable healthcare to a seemingly ever-expanding population. We look at what countries in the Middle East, in particular Qatar, are doing to implement a sustainable healthcare funding mechanism. Read the report on page 36.

Last year Syria experienced its most deadly year since fighting began there. It is a tragedy beyond comprehension. Healthcare has been pushed into crisis mode. It is estimated that more Syrians now die as a result of inadequate healthcare than as a direct consequence of the ongoing conflict. In our report on page 24 we look at what the WHO is doing to assist in the provision of healthcare in the war-torn country.

Researchers are testing a new stem cell treatment on multiple sclerosis patients with some showing 'miraculous' results, such as complete recovery after 10 years of suffering from the debilitating disease. Read the report on page 73.

We have another issue full of informative healthcare news and reviews. Read on…

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contents

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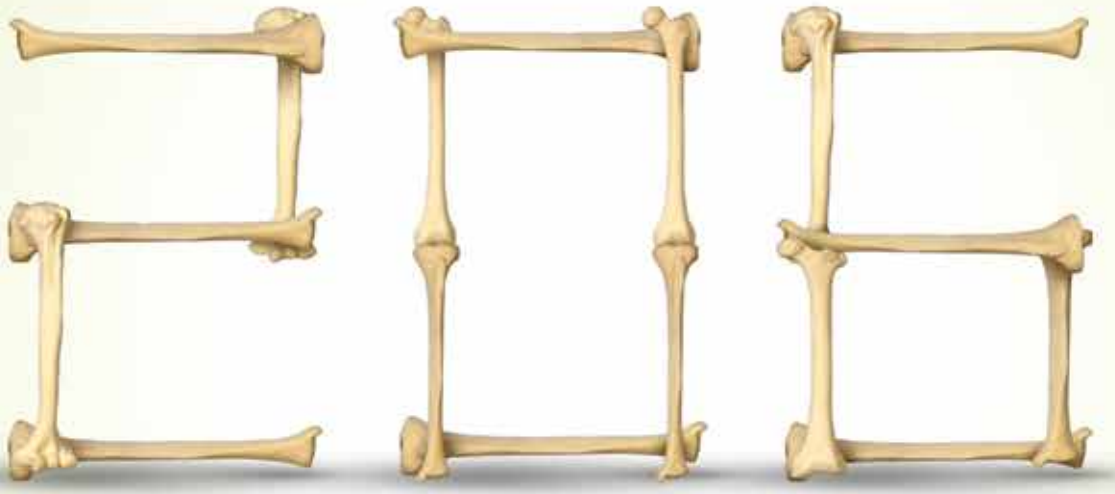

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middle east monitor

Update from around the region

Dr Ala Alwan, Regional Director, WHO EMRO

WHO regional director inaugurates primary healthcare centre in Dohuk, Iraq

WHO's Regional Director for the Eastern Mediterranean, Dr Ala Alwan, visited Dohuk governorate of the Kurdistan region of Iraq to officially hand over 15 ambulances and two mobile medical clinics to Dohuk health authorities. The donation will provide health services and medical treatments for more than 60,000 beneficiaries for three months.

Following the hand-over ceremony, Dr Alwan visited Bajet Kandala camp for internally displaced persons (IDPs) and met with families to hear first-hand accounts of their urgent health needs and inaugurate the primary healthcare centre established with financial support from WHO. The Kurdistan Minister of Health, Dr Rekawt Hama Rasheed, and the renowned Iraqi musician, Naseer Shamma, visited the camp and is raising funds for the WHO through fundraising concerts to raise awareness about the serious humanitarian situation.

Dr Rasheed thanked WHO for the most recent donations, saying: "I would like to acknowledge the commitment and tremendous efforts WHO has been making to respond to the urgent needs of the displaced population. This donation of mobile clinics and 15 ambulances will improve the delivery of health services to vulnerable populations, mostly in out-of-reach areas."

"It is critical to respond urgently to the lack of basic health services for the internally displaced Iraqi population," said Dr Alwan. "Millions of men, women and children have had their lives needlessly destroyed and face an uncertain future. Many of these people are particularly vulnerable: young children, pregnant women, people with disabilities, the elderly, and those who need life-saving treatment for diseases like cancer, diabetes and heart conditions. WHO has an established presence on the ground in Dohuk and is working with health authorities and partners to improve access for all affected populations to health care and services they urgently need."

Over the past three years, Dohuk has seen its population increase by almost 20%, hosting more than 50% of all Syrian refugees in Iraq and receiving more than half a million displaced Iraqis since June 2014, accounting for almost 30% of the total number of IDPs in the entire country. There are currently 17 IDP camps in Dohuk, with many IDPs also living among host communities and in public spaces, such as abandoned buildings and unused schools. As a result of the influx of IDPs in Dohuk, the health system is overwhelmed, with an increase of more than 65% of the patient caseload on existing health facilities.

Key public health concerns among affected populations in Dohuk include increased risk of communicable diseases due to overcrowded living conditions, increased risk of mortality or complications as a result of untreated chronic conditions such as diabetes, chronic respiratory disease and cancer; and increased need for mental health services for those suffering from grief, non-pathological distress, depression, and anxiety disorders, including post-traumatic stress disorder.

To prevent the spread of communicable diseases, especially in areas with high concentrations of IDPs, the WHO has strengthened the communicable disease surveillance system throughout the governorate. In partnership with UNICEF and the Dohuk Directorate of Health, more than 254,000 children under five years of age were immunized against polio and 216,000 children under five years of age immunized against measles, during the most recent vaccination campaign from 22 February to 10 March 2015 targeting the host community, IDPs and Syrian refugees.

WHO provided a total of four mobile medical clinics, procured through funding from Saudi Arabia, to deliver primary healthcare services to IDPs in remote areas; and 15 ambulances to support the referral system in the camps for IDPs; and medicines and medical supplies for 1.2 million beneficiaries. Together with Iraqi health authorities, more than 5.6 million children have been vaccinated against polio and 3.9 million children against measles, through national and sub-national immunization campaigns.

"While much has been achieved in Iraq, much more needs to be done," noted Dr Alwan. "With additional funding, we will be able to reach more people and save more lives."

More than five million people in Iraq are in need of humanitarian and health services. Of the US$314.2 million required by the health sector, only US$95.5 million has been received (30.4%), leaving a critical funding gap of US$218.7 million.

Rashid Centre for Disabled signs MOU with Sultan Bin Abdulaziz Humanitarian City

The reputed Rashid Centre for the Disabled, a humanitarian mission for 300 children with special needs since 1994, signed a Memorandum of Understanding with the prestigious healthcare organization Sultan Bin Abdulaziz Humanitarian City of Riyadh, Saudi Arabia, in order to work collaboratively to promote and advance the mission of *Enabling the Disabled*. The Sultan Abdulaziz Humanitarian City, a 400-bed rehabilitation hospital and medical centre formed in 2002, caters to both in- and outpatients.

This partnership aims to jointly develop and co-ordinate medical, educational and training programmes for both patients and staff and to increase the scope and quality of rehabilitation care in Dubai and beyond. The MOU will enable an exchange of expertise, development of programmes and expansion of the complex with further mutual growth.

Mr Abdullah Hamed Bin Zarah (CEO, Sultan Bin Abdulaziz Humanitarian City) and Mrs Mariam Othman (Director General, Rashid Centre for Disabled) signed the MOU at Rashid's premises at the end

Mariam Othman (Director General, Rashid Centre for Disabled) and Abdullah Hamed Bin Zarah (CEO, Sultan Bin Abdulaziz Humanitarian City) sign the MOU.

of February 2015. Rashid Centre awarded a trophy and certificate to the humanitarian city for their efforts and Mrs Mariam conveyed gratitude and confidence to Sultan Bin Abdulaziz Humanitarian city for all its support throughout the years.

Both parties agreed they have now formed an even stronger alliance to support the special needs and disability cause, a pertinent issue worldwide.

Canadian Specialist Hospital joins Dubai Medical Tourism Club

Canadian Specialist Hospital (CSH), one of the pioneers in the field of medical tourism in the UAE, has now become an active member of the Dubai Medical Tourism (DMT) Club in order to create an environment to share experiences and promote Dubai as a medical tourism hub.

Canadian Specialty Hospital will follow DMT's 3Ts value proposition of trust for patients in terms of best facility, experience and price, transparency in pricing, treatment and service offerings as well as offering the best talent to cater to patients.

"Canadian Specialty Hospitals is no stranger to medical tourism. Our efforts in this field started way back in 2006. CSH is fully licensed by DHA and recognized as one of the health tourism centres in Dubai. We work very closely with DHA and follow their guidelines and we always participate in DHA's activities and events in this regard," said Dr Haider Al Zubaidy, CEO, Canadian Specialist Hospital.

"The hospital has conducted several marketing campaigns and designed attractive packages covering all specialities ranging from comprehensive health check-ups, to laparoscopic neurosurgery for overseas patients. Our hospital receives hundreds of patients from across Eastern Europe, Africa and other countries in the Middle East," Haider added.

If a patient wishes to avail of a treatment in CSH, the hospital makes all necessary arrangements for the patients and relatives, inclusive of visa, accommodation, consultation, admission and transportation. "We have to ensure that we make the patients feel at home and don't make them feel that they are in a foreign destination. A vast range of services need to be provided once the patient is admitted to the hospital, including something as basic as translations and all daily requirements during their stay," said Haider.

Dubai is considered one of the world's best and most cost-effective medical tourism hubs and attracts tourists from across the globe. This is largely due to the affordable cost of treatment, state-of-the-art medical facilities and the presence of bilingual medical team that can cater to several nationalities.

The medical tourism industry, a multi-billion dollar business, is expecting over 20 million visitors by 2020, and Dubai stands to benefit from the fact that healthcare costs and hospital waiting times in the US and Europe are on the rise. Highly qualified doctors from abroad are currently offering top procedures and treatments in Dubai, which will help it carve a niche with infrastructure and medical facilities of international repute.

CSH has been reaccredited by Joint Commission International (JCI), the world's largest healthcare accreditor, in recognition of the hospital's continuing commitment to patient safety, quality and ethical practices.

Moorfields Eye Hospital Dubai appoints leading research specialist


Dr Vinod Gauba

Moorfields Eye Hospital Dubai, one of the region's leading specialist eye care providers, has appointed Associate Professor Dr Vinod Gauba, FRCOphth (UK), PAMEd (UK), MBBS (Hons, UK), as Director of Education and Research for the Middle East region. Gauba, who grew up in the UAE, is a consultant ophthalmologist and ophthalmic plastic surgeon and also has substantial experience as a clinical educator and international researcher.

Gauba undertook his medical training in the UK. After completing his medical degree (with honours) from Guy's King's and St.Thomas' School of Medicine in London, he trained for seven years in ophthalmology, completing the full UK training programme including specialising in paediatric ophthalmology and medical ophthalmology. He also completed three fellowship programmes - in oculofacial surgery, orbital and lacrimal surgery, during which he also worked and trained at Moorfields Eye Hospital London. He did dedicated refractive surgery training before taking up a consultant position at the Royal Victoria Eye and Ear Hospital in Dublin, Ireland, before returning to Dubai in 2008.

Gauba's Higher Degree in Medical Research from the University of Oxford and Leeds and his post-graduate qualification in Medical Education from the University of Warwick, together with his extensive surgical experience, create a unique combination as a clinical educator, experienced clinician and international researcher. He is a fellow of the Royal College of Ophthalmologists, where he has been responsible for organizing and supervising educational activities. He has also researched and published extensively including authoring textbooks and peer review articles.

In addition to the prestigious Mahatma Gandhi Gold Medal, presented at the House of Lords, London in 2014, in recognition of his dedication to global advancement and achievement in ophthalmology, Gauba was also the winner of the Cleveland Clinic Clinician of the Year Award (Arab Health Awards 2013) and the Young Surgeon of the Year Award (Arab Health Awards 2012) and several other accolades. Gauba speaks English, French, Spanish, Hindi, Urdu and has a post-graduate qualification in Arabic, along with fluent spoken Khaleeji Arabic.

Commenting on the new appointment, Mr Mariano Gonzalez, Managing Director of Moorfields Eye Hospital Dubai, said: "We are delighted to welcome Dr Gauba to the Moorfields team in Dubai, where his exceptional experience and skills will be a tremendous asset, as we continue to develop our services in the region. Our mission in the Middle East is to offer the best eye care and treatments available to patients here, but we also plan to focus on the other two key aspects of our mission – clinical education for medical professionals, from eye care professionals to school nurses, and clinical research. These combine to create the really unique impact of Moorfields and mirror the work we have undertaken in London for more than 200 years."

Professor Eberhart Zrenner receives the Gold Medal for his presentation on the Artificial Vision Industry at Saudi Ophthalmology 2015 Conference

Retina implant pioneer gets Saudi Ophthalmological Society gold medal

Retina Implant AG has announced that Professor Eberhart Zrenner, founder and lead clinical trial investigator and founding director of the Institute of Ophthalmic Research, University of Tuebingen, Germany, was awarded the Saudi Ophthalmological Society Gold Medal Lecture award at the Saudi Ophthalmology 2015 annual meeting in Riyadh. The award, presented by the Society's President HRH Prince Abdulaziz bin Ahmed Al Saud, was given in recognition of Professor Zrenner's presentation on the state of artificial vision development on 2 March 2015.

The presentation, "The Various Electronic Implants For Blind Patients Presently Available & Under Development", discussed the use of retinal implants, including Retina Implant's Alpha IMS subretinal microchip, to restore partial vision to patients blinded by retinitis pigmentosa (RP). Zrenner also presented four lectures on topics including retinal implants and the OkuStim transcorneal electrical stimulation therapy.

Commenting on the award, Professor Zrenner said, "It is an incredible honour to be presented this prestigious award by HRH Prince Abdulaziz bin Ahmed Al Saud. I accept this award on behalf of the entire research team who continue to be an integral part of the progress we have made and shared at this conference. We have long strived for a treatment that restores vision to RP patients and it is gratifying that the day we have been working towards for more than a decade is finally upon us."

The Saudi Ophthalmology 2015 Conference is a combined meeting of the 32nd Annual Symposium of the King Khaled Eye Specialist Hospital and the 27th Annual Scientific Meeting of the Saudi Ophthalmological Society, in collaboration with the Ophthalmology Department, College of Medicine, King Saud University. The conference focused on recent advances in the following fields of ophthalmology: cataract, cornea, refractive surgery, glaucoma, pathology, oculoplastics, prevention of blindness, optometry and retina. Saudi Ophthalmology strives to update participants on the latest developments in ophthalmology techniques and equipment, share expertise from renowned international guest speakers and educate participants to provide a higher level of ophthalmic care.

Retina Implant AG is the leading developer of sub-retinal implants for partially sighted and blind patients. After extensive research with German university hospitals and institutes which began with a large grant from the German Federal Ministry of Research and Education in 1996, Retina Implant AG was founded by Dr Eberhart Zrenner and his colleagues in 2003 with private investors with the goal of developing a fully functioning electronic retinal implant to restore useful vision to the blind. Retina Implant began implanting into human patients in 2005 and started a second, larger clinical trial in 2010. In July 2013, Retina Implant's wireless subretinal implant technology, Alpha IMS, received a CE mark.

To learn more about Retina Implant, follow Twitter @RetinaImplant (*www.twitter.com/RetinaImplant*). MEH

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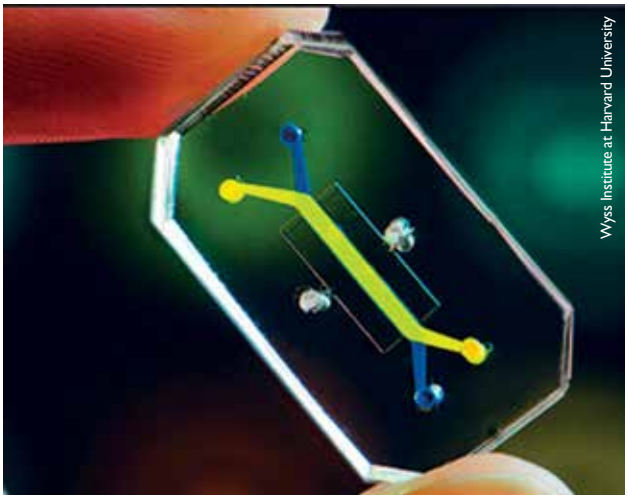

Wyss Institute's Organs-on-Chips acquired by the Museum of Modern Art

Museum of Modern Art acquires human organs-on-chip

Samples of the Wyss Institute's Human Organs-on-Chips were formally acquired by the Museum of Modern Art (MoMA) of New York City on March 2, 2015, and are on display in MoMA's latest Architecture and Design Exhibition, *"This Is For Everyone: Design For The Common Good"*, until January 2016.

The human organs-on-chips were recognized by Paola Antonelli, the museum's senior curator in the Department of Architecture and Design, for their state-of-the-art design and rendering which allows them to emulate complex human organ structures and functions using a combination of living cells and mechanical components encased in a flexible translucent polymer fabricated using computer microchip manufacturing methods.

The organs-on-chips devices are made of clear, silicone rubber and contain hollow channels that are lined by living cells and fed with flowing nutrient–rich fluids and liquid blood substitutes. The tissues mimic blood flow, air movements and physical distortion of internal organs, such as those caused by breathing motions and peristalsis, by application of cyclic vacuum through adjacent microchannels.

Scientists at the Wyss Institute led by the Institute's Founding Director Donald Ingber, M.D., Ph.D., and former Wyss Technology Department Fellow Dan Dongeun Huh, Ph.D, first developed a living breathing lung-on-a-chip that was published in Science in 2010. The Wyss team also leveraged this design to create various kinds of organs-on-chips to represent different organs in the human body. They can be utilized on each's own for the study of one specific organ, or their vascular, flowing channels can be connected to link different organs using a stream of fluid, mimicking the blood and nutrient movement through the human body's vascular system. This feature allows scientists to replicate a human "body" on chips to see how drugs or chemicals impact each organ as the body metabolizes different compounds.

The design of organs-on-chips is highly effective at mimicking the function of real human organs because it contains cultures of living cells from different types of tissues, including blood capillaries, that make up living organs, and because the chips replicate the physical motions and flow seen in the human body that are crucial for organ function.

From the numerous different organs-on-chips created by Ingber and his team, the human lung-on-a-chip, gut-on-a-chip, and liver-on-a-chip have been selected for display at MoMA. Their installation in the exhibition, *"This Is For Everyone: Design Experiments for the Common Good"* opened to the public on February 14, 2015 and will remain on display until January 2016.

The exhibition explores contemporary design in the digital age and takes its name from a 2012 tweet by Tim Berners-Lee, the British computer scientist who invented the World Wide Web in 1989. His message, *This Is for Everyone*, lit up the stadium at the Olympics Opening Ceremony during the 2012 games in London, and celebrated how the Internet has created limitless possibilities for information sharing and knowledge expansion.

"As design is absolutely key to everything we do at the Wyss Institute, and it has been a guiding light for me personally from the start of my career, it's a thrill and an honour to see the organs-on-chips technology find a home amongst MoMA's collection of world-renowned designs," said Ingber, who is a founder of the emerging field of biologically inspired engineering. "I have always felt that great scientists are closer to artists than any other profession, and great advances come from crossing the boundary between these disciplines. So it's exciting to see MoMA's curators embrace the subtlety and simplicity of our microscale design, and communicate the power of bridging the art-science interface to the public."

Human organs-on-chips represent a powerful alternative to animal testing models by mimicking human organs for purposes such as: testing of drugs, cosmetics, chemicals and toxins; understanding infections and inherited diseases; and creating replicas of personalized organs or organs of genetically related sub-populations to advance precision medicine.

WHO condemns attack on health facility in Syria

The WHO has expressed deep concern over damages to health facilities due to conflict in the Syrian Arab Republic and the far-reaching implications on all Syrians, especially those in dire need of medical attention.

The statement was provoked by incident in March at Aisha Hospital in Albukamal city in Deir ez-Zor governorate, which resulted in the death of two women and three newborns who were in incubators at the time of the strike. Critical hospital equipment was also destroyed including incubators, electrocardiography machines and the laboratory.

Of the seven public hospitals and 103 health centres in Deir ez-Zor, only one hospital and eight health centres are currently fully functional. There are only 27 female doctors and 339 male doctors for 794,000 people in need.

"At a time when the few health facilities are overwhelmed with patients, it is important that their functionality be protected and health workers and humanitarian aiders allowed to provide required health services and humanitarian aid" says Elizabeth Hoff, WHO Representative to Syria.

Hoff laments that over 50% of hospitals in the Syrian Arab Republic have ceased to function due to damages arising from the conflict.

The WHO Representative reiterated the obligations under the international humanitarian law and Geneva Conventions for the protection of civilians, health facilities and health professionals during conflict.

"Health facilities must be treated as neutral premises and never exploited for military purposes. It is in the interest of all parties involved in the conflict to preserve the neutrality and functionality of health infrastructures, personnel and civilians", she stressed.

Why some people with diabetes can't buy insulin in the US

Many patients with diabetes have lapses in medication that can lead to serious complications requiring hospitalization. A generic version of insulin, the lifesaving diabetes drug used by six million people in the United States, has never been available there because drug companies have made incremental improvements that kept insulin under patent from 1923 to 2014.

As a result, say two Johns Hopkins internist-researchers, many who need insulin to control diabetes can't afford it, and some end up hospitalized with life-threatening complications, such as kidney failure and diabetic coma.

In a study published on March 19, 2015, in the *New England Journal of Medicine*, authors Jeremy Greene, MD, Ph.D, and Kevin Riggs, MD, MPH, describe the history of insulin as an example of "evergreening," in which pharmaceutical companies make a series of improvements to important medications that extend their patents for many decades.

This keeps older versions off the generic market, the authors say, because generic manufacturers have less incentive to make a version of insulin that doctors perceived as obsolete.

Newer versions are somewhat better for patients who can afford them, say the authors, but those who can't suffer painful, costly complications.

"We see generic drugs as a rare success story, providing better quality at a cheaper price," says Greene, an associate professor of the history of medicine at the Johns Hopkins University School of Medicine and a practicing internist. "And we see the progression from patented drug to generic drug as almost automatic. But the history of insulin highlights the limits of generic competition as a framework for protecting the public health."

More than 20 million Americans have diabetes, in which the body fails to properly use sugar from food due to insufficient insulin, a hormone produced in the pancreas. Diabetes can often be managed without drugs or with oral medications, but some patients need daily insulin injections. The drug can often cost from $120 to $400 per month without prescription drug insurance.

"Insulin is an inconvenient medicine even for people who can afford it," says Riggs, a research fellow in general internal medicine and the Berman Institute of Bioethics at Johns Hopkins. "When people can't afford it, they often stop taking it altogether."

Patients with diabetes who are not taking prescribed insulin come to Riggs' and Greene's Baltimore-area clinics complaining of blurred vision, weight loss and intolerable thirst – symptoms of uncontrolled diabetes, which can lead to blindness, kidney failure, gangrene and loss of limbs.

The two doctors decided to find out why no-one makes generic insulin. A University of Toronto medical team discovered insulin in 1921, and in 1923, the university, which held the first patent, gave drug companies the right to manufacture it and patent any improvements. In the 1930s and 1940s, pharmaceutical companies developed long-acting forms that allowed most patients to take a single daily injection.

In the 1970s and 1980s, manufacturers improved the purity of cow- and pig-extracted insulin. Since then, several companies have developed synthetic analogs.

Biotech insulin is now the standard in the US, the authors say. Patents on the first synthetic insulin expired in 2014, but these newer forms are harder to copy, so the unpatented versions will go through a lengthy Food and Drug Administration approval process and cost more to make.

When these insulins come on the market, they may cost just 20 to 40 percent less than the patented versions, Riggs and Greene write.

WHO highlights serious threat posed by exposure to recreational noise

Some 1.1 billion teenagers and young adults are at risk of hearing loss due to the unsafe use of personal audio devices, including smartphones, and exposure to damaging levels of sound at noisy entertainment venues such as nightclubs, bars and sporting events, according to the WHO.

Hearing loss has potentially devastating consequences for physical and mental health, education and employment.

Data from studies in middle- and high-income countries analysed by WHO indicate that among teenagers and young adults aged 12-35 years, nearly 50% are exposed to unsafe levels of sound from the use of personal audio devices and around 40% are exposed to potentially damaging levels of sound at entertainment venues. Unsafe levels of sounds can be, for example, exposure to in excess of 85 decibels (dB) for eight hours or 100dB for 15 minutes.

"As they go about their daily lives doing what they enjoy, more and more young people are placing themselves at risk of hearing loss," notes Dr Etienne Krug, WHO Director for the Department for Management of Non-communicable Diseases, Disability, Violence and Injury Prevention. "They should be aware that once you lose your hearing, it won't come back. Taking simple preventive actions will allow people to continue to enjoy themselves without putting their hearing at risk."

Safe listening depends on the intensity or loudness of sound, and the duration and frequency of listening. Exposure to loud sounds can result in temporary hearing loss or tinnitus which is a ringing sensation in the ear. When the exposure is particularly loud, regular or prolonged, it can lead to permanent damage of the ear's sensory cells, resulting in irreversible hearing loss.

WHO recommends that the highest permissible level of noise exposure in the workplace is 85 dB up to a maximum of eight hours per day. Many patrons of nightclubs, bars and sporting events are often exposed to even higher levels of sound, and should therefore considerably reduce the duration of exposure. For example, exposure to noise levels of 100 dB, which is typical in such venues, is safe for no more than 15 minutes.

Teenagers and young people can better protect their hearing by keeping the volume down on personal audio devices, wearing earplugs when visiting noisy venues, and using carefully fitted, and, if possible, noise-cancelling earphones/headphones. They can also limit the time spent engaged in noisy activities by taking short listening breaks and restricting the daily use of personal audio devices to less than one hour. With the help of smartphone apps, they can monitor safe listening levels. In addition they should heed the warning signs of hearing loss and get regular hearing check-ups.

Governments also have a role to play by developing and enforcing strict legislation on recreational noise, and by raising awareness of the risks of hearing loss through public information campaigns. Parents, teachers and physicians can educate young people about safe listening, while managers of entertainment venues can respect the safe noise levels set by their respective venues, use sound limiters, and offer earplugs and "chill out" rooms to patrons. Manufacturers can design personal audio devices with safety features and display information about safe listening on products and packaging.

To mark International Ear Care Day, celebrated each year on 3 March WHO launched the "Make Listening Safe" initiative to draw attention to the dangers of unsafe listening and promote safer practices.

Worldwide, 360 million people have moderate to profound hearing loss due to causes such as noise, genetic conditions, complications at birth, infectious diseases, chronic ear infections, the use of particular drugs and ageing. It is estimated that half of all cases of hearing loss are avoidable.

NIH announces $41.5 million in funding for the human placenta project

Geared to improving health of mothers and children, the National Institutes of Health has dedicated $41.5 million for an initiative to understand and monitor the development of the human placenta during pregnancy.

"The placenta is a lifeline that gives us our start in the world," said Alan E. Guttmacher, M.D., director of NIH's Eunice Kennedy Shriver National Institute of Child Health and Human Development, which is leading the research effort. "It influences the health of mother and child not just during pregnancy, but for the rest of their lives. However, despite its important role, the placenta has received comparatively little attention."

The placenta is a temporary organ that ferries oxygen and nutrients from the mother to her foetus while at the same time removing potentially toxic substances like carbon dioxide. It also produces hormones to help maintain pregnancy and perform the unique immunologic function of allowing the mother and foetus to co-exist.

Problems with the placenta may lead to negative pregnancy outcomes for mother or foetus, such as pre-eclampsia (a disorder of high blood pressure in pregnancy), gestational diabetes, pre-term birth, and stillbirth. Placental problems have also been linked to a higher risk of heart disease later in life, for both mother and child.

"If we can develop technologies to monitor placental health during pregnancy, we should be able to prevent some of these problems from happening," said Dr Guttmacher. "We hope this funding opportunity will attract a broad range of researchers and clinicians to help -- placental biologists, obstetricians, and experts in imaging, bio-engineering, and other arenas."

Until now, most studies of the placenta have been limited to ultrasound exams, blood tests, and the examination of placental tissue after delivery. These studies have provided important foundational knowledge, Guttmacher said, but many questions remain about normal placental development and function and the organ's role in health and disease.

The initiative seeks to spur new technologies or innovative applications of existing technologies, such as imaging tools or sensors, that would allow practitioners to safely track placental functioning during pregnancy. Such technologies might gauge how blood and oxygen flow through the placenta, how it attaches to the uterine wall, and how it conveys nutrients to the foetus.

"Advances in imaging and bioengineering hold terrific promise for the study of

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the placenta," said Roderic Pettigrew, Ph.D., M.D., director of NIH's National Institute of Biomedical Imaging and Bioengineering, which is co-sponsoring the Human Placenta Project's latest initiative. "We expect that the technologies resulting from this initiative will also translate to other organs and open new avenues of study that will benefit human health."

The latest funding announcement for the Human Placenta Project, its third and largest to date, also requires applicants to address the effects of environmental factors -- such as air pollution, medications, and maternal diet -- on the placenta during pregnancy.

"The placenta is a fascinating organ, but it's one of the least understood," said Guttmacher. "For researchers who want to apply their skills in an area of medicine that isn't being looked at as much as both scientific opportunity and human health warrant, this is a wonderful chance."

WHO issues its first hepatitis B treatment guidelines

WHO today issued its first-ever guidance for the treatment of chronic hepatitis B, a viral infection which is spread through blood and body fluids, attacking the liver and resulting in an estimated 650,000 deaths each year – most of them in low- and middle-income countries.

Worldwide, some 240 million people have chronic hepatitis B virus with the highest rates of infection in Africa and Asia. People with chronic hepatitis B infection are at increased risk of dying from cirrhosis and liver cancer.

Effective medicines exist that can prevent people developing these conditions so they live longer. But most people who need these medicines are unable to access them or can only obtain substandard treatment. One reason for this is the lack of clear evidence-based guidance for countries (especially low- and middle-income countries) as to who should be treated and what medicines to use.

"Deciding who needs treatment for hepatitis B depends on a number of factors," says Dr Stefan Wiktor, who leads WHO's Global Hepatitis Programme. "These new guidelines, which give treatment recommendations that rely on simple, inexpensive tests, will help clinicians make the right decisions."

The "*WHO guidelines for the prevention, care and treatment of persons living with chronic hepatitis B infection*" lay out a simplified approach to the care of people living with chronic hepatitis B, particularly in settings with limited resources.

The guidance covers the full spectrum of care from determining who needs treatment, to what medicines to use, and how to monitor people long-term.

Key recommendations include:

- the use of a few simple non-invasive tests to assess the stage of liver disease to help identify who needs treatment;
- prioritizing treatment for those with cirrhosis - the most advanced stage of liver disease;
- the use of two safe and highly effective medicines, tenofovir or entecavir, for the treatment of chronic hepatitis B; and
- regular monitoring using simple tests for early detection of liver cancer, to assess whether treatment is working, and if treatment can be stopped.

The special needs of specific populations, such as people co-infected with HIV, as well as children and adolescents, and pregnant women are also considered.

The two recommended medicines are already available in many countries as generics, and thus are relatively inexpensive, costing as little as US$5 per person per month. "Because for so many people treatment is lifelong, it is important that patients can access these medicines at the lowest possible price" says Dr Wiktor.

A number of countries are beginning to develop hepatitis B treatment programmes, and the newly-released document also provide guidance on how to organize hepatitis care and treatment services.

"For example, countries need to think about ways to improve access to medicines and how best to deliver quality care that builds on existing health services and staff," says Dr Philippa Easterbrook, from the WHO Global Hepatitis Programme.

Treatment can prolong life for people already infected with hepatitis B, but it is also important to focus on preventing new infections. WHO recommends that all children are vaccinated against hepatitis B, with a first dose given at birth. Some countries, particularly in Asia, have reduced the rates of childhood hepatitis B infection through universal childhood vaccination. The challenge now is to scale up efforts to ensure that all children worldwide are protected from the virus.

Another route of infection is through the re-use of medical equipment, in particular of syringes. WHO has recently launched a new policy on injection safety that will also help prevent new hepatitis B infections. The policy calls for the worldwide use of "smart" syringes to prevent the re-use of syringes or needles.

The new guidelines on treating hepatitis B follow on from the publication last year by WHO of its first-ever guidelines on treating hepatitis C.

Nibib launches 'Want to be a bioengineer?' game app

How do you keep an artificial limb attached to the body? What lab-grown organ have scientists successfully transplanted into patients? You can find the answer to these questions and many more while playing *Want to Be a Bioengineer*?, a game for middle and high school students, designed by the National Institute of Biomedical Imaging and Bioengineering (NIBIB), part of the National Institutes of Health.

The game introduces students to real-life examples of how bioengineers are improving people's lives, from helping paralyzed individuals stand, to re-growing fingertips, to finding new ways to see inside the body.

During the game, students answer a series of multiple choice questions pertaining to subjects in rehabilitation engineering, regenerative medicine, and biomedical imaging. At the end, a score is generated based on how many questions are answered correctly.

"It is truly an exciting time to be entering the field of bioengineering. Yet, students don't often know what it means to be a bioengineer," said NIBIB Director

Roderic Pettigrew, Ph.D., M.D. "The bio-engineers we support are building bio-artifical kidneys, growing functional cartilage, and developing implantable sensors that can detect real-time changes in biochemistry. They are coming up with ways to make tumours glow, supercool organs so that they can stay outside the body longer for transplantation, and store vaccines so they don't require refrigeration. They are making biomedical technologies better, faster, cheaper, and smaller and, in doing so, are profoundly changing health care in the US and around the world."

"This game is a fun and easy way to introduce a younger generation to the exciting possibilities of bio-engineering. It plants the seed that if you're interested in science and technology, enjoy being creative, and have a desire to help people, you might consider becoming a bio-engineer," said Pettigrew.

The game can be played on the NIBIB website at <*http://www.nibib.nih.gov/science-education*> or downloaded for free to your phone or tablet from the iTunes App store.

New big data portal aims to speed up Alsheimer's drug discovery

A National Institutes of Health-led public-private partnership to transform and accelerate drug development achieved a significant milestone recently with the launch of a new Alzheimer's Big Data portal – including delivery of the first wave of data – for use by the research community. The new data sharing and analysis resource is part of the Accelerating Medicines Partnership (AMP), an unprecedented venture bringing together NIH, the US Food and Drug Administration, industry and academic scientists from a variety of disciplines to translate knowledge faster and more successfully into new therapies.

The opening of the AMP-AD Knowledge Portal and release of the first wave of data will enable sharing and analyses of large and complex biomedical datasets. Researchers believe this approach will ramp up the development of predictive models of Alzheimer's disease and enable the selection of novel targets that drive the changes in molecular networks leading to the clinical signs and symptoms of the disease.

"We are determined to reduce the cost and time it takes to discover viable therapeutic targets and bring new diagnostics and effective therapies to people with Alzheimer's. That demands a new way of doing business," said NIH Director Francis S. Collins, M.D., Ph.D. "The AD initiative of AMP is one way we can revolutionize Alzheimer's research and drug development by applying the principles of open science to the use and analysis of large and complex human data sets."

Developed by Sage Bionetworks a Seattle-based non-profit organization promoting open science, the portal will house several waves of Big Data to be generated over the five years of the AMP-AD Target Discovery and Preclinical Validation Project by multi-disciplinary academic groups. The academic teams, in collaboration with Sage Bionetworks data scientists and industry bioinformatics and drug discovery experts, will work collectively to apply cutting-edge analytical approaches to integrate molecular and clinical data from over 2 000 post-mortem brain samples.

The National Institute on Aging (NIA) at NIH supports and co-ordinates the multidisciplinary groups contributing data to the portal. The AMP Steering Committee for the Alzheimer's Disease Project is composed of NIA and the National Institute of Neurological Disorders and Stroke, both of NIH, the US Food and Drug Administration, four pharmaceutical companies (AbbVie, Biogen Idec, GlaxoSmithKline and Lilly) and four non-profit groups (Alzheimer's Association, Alzheimer's Drug Discovery Foundation, Geoffrey Beene Foundation and US Against Alzheimer's) and is managed through the Foundation for the NIH.

Because no publication embargo is imposed on the use of the data once they are posted to the AMP-AD Knowledge Portal, it increases the transparency, reproducibility and translatability of basic research discoveries, according to Suzana Petanceska, Ph.D., NIA's program director leading the AMP-AD Target Discovery Project.

"Simply stated, we can work more effectively together than separately," concluded Petanceska. MEH

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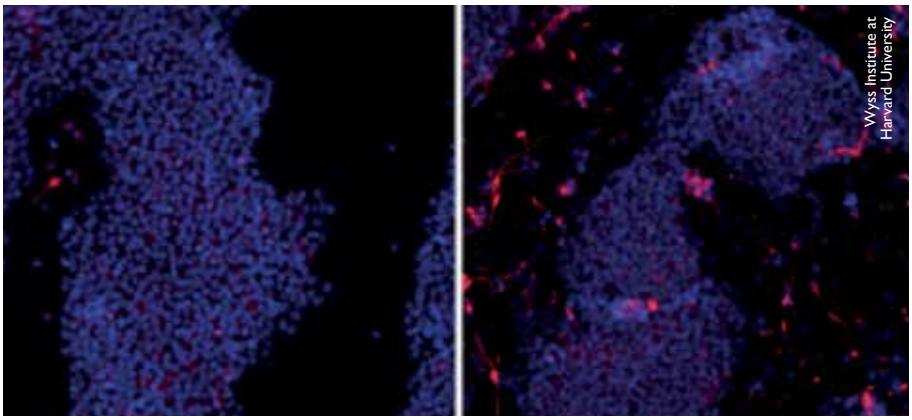
Medical research news from around the world



In these images, the ability of the new Cas9 approach to differentiate stem cells into brain neuron cells is visible. On the left, a previous attempt to direct stem cells to develop into neuronal cells shows a low level of success, with limited red–colored areas indicating low growth of neuron cells. On the right, the new Cas9 approach shows a 40–fold increase in the number of neuronal cells developed, visible as red-colored areas on the image.

New process developed to activate genes on demand

When it comes to gene expression – the process by which our DNA provides the recipe used to direct the synthesis of proteins and other molecules that we need for development and survival – scientists have so far studied one single gene at a time. However, a new approach developed by Harvard geneticist George Church, Ph.D., can help uncover how tandem gene circuits dictate life processes, such as the healthy development of tissue or the triggering of a particular disease, and can also be used for directing precision stem cell differentiation for regenerative medicine and growing organ transplants.

The findings, reported by Church and his team of researchers at the Wyss Institute for Biologically Inspired Engineering at Harvard University and Harvard Medical School in , show promise that precision gene therapies could be developed to prevent and treat disease on a highly customizable, personalized level, which is crucial given that diseases develop among diverse pathways among genetically varied individuals.

The approach leverages the Cas9 protein, which has already been employed as a Swiss Army knife for genome engineering, in a novel way. The Cas9 protein can be programmed to bind and cleave any desired section of DNA, but now Church's new approach activates the genes, and binds rather than cleaving them, triggering them to activate transcription to express or repress desired genetic traits. By engineering the Cas9 to be fused to a triple-pronged transcription factor, Church and his team can robustly manipulate single or multiple genes to control gene expression.

"In terms of genetic engineering, the more knobs you can twist to exert control over the expression of genetic traits, the better," said Church, a Wyss Core Faculty member who is also Professor of Genetics at Harvard Medical School and Professor of Health Sciences and Technology at Harvard and MIT. "We could essentially dial gene expression up or down with great precision."

Such a capability could lead to gene therapies that would mitigate age-related degeneration and the onset of disease. In the study, Church and his team demonstrated the ability to manipulate gene expression in yeast, flies, mouse and human cell cultures.

"We envision using this approach to investigate and create comprehensive libraries that document which gene circuits control a wide range of gene expression," said one of the study's lead authors Alejandro Chavez, Ph.D., Postdoctoral Fellow at the Wyss Institute.

The new Cas9 approach could also potentially target and activate sections of the genome made up of genes that are not directly responsible for transcription. These sections, which comprise up to 90% of the genome in humans, have previously been considered to be useless DNA "dark matter" by geneticists. In contrast to translated DNA, which contains recipes of genetic information used to express traits, this DNA dark matter contains transcribed genes which act in mysterious ways, with several of these genes often having influence in tandem.

But now, that DNA dark matter could be accessed, allowing scientists to document which non-translated genes can be activated in tandem to influence gene expression. These non-translated genes could also be turned into a docking station of sorts.

To demonstrate this point, the researchers used it to grow brain neuron cells from stem cells and found that using the approach to program development of neuronal cells was 40–fold more successful than prior established methods. This is the first time that Cas9 has been leveraged to efficiently differentiate stem cells into brain cells, and can also be used in combination with other gene editing technologies.

UK scientists create cartilage from stem cells

Scientists have succeeded in producing cartilage formed from embryonic stem cells that could in future be used to treat osteoarthritis.

In research funded by Arthritis Research UK, Professor Sue Kimber and her team in the Faculty of Life Sciences at the University of Manchester have developed a protocol under strict laboratory conditions to grow and transform embryonic stem cells into cartilage cells (also known as chondrocytes).

"This work represents an important step forward in treating cartilage damage by using embryonic stem cells to form new tissue, although it's still in its early experimental stages," said Kimber.

Their research was published in *Stem Cells Translational Medicine*.

During the study, the team analysed the ability of embryonic stems cells to become precursor cartilage cells. They were then implanted into cartilage defects in the knee joints of rats.

After four weeks, cartilage was partially repaired and following 12 weeks, a smooth

surface, which appeared similar to normal cartilage, was observed. Further study of this newly regenerated cartilage showed that cartilage cells from embryonic stem cells were still present and active within the tissue.

Developing and testing this protocol in rats is the first step in generating the information needed to run a study in people with arthritis. However, more data will need to be collected to check that this protocol is effective and that there are no toxic side-effects.

Chondrocytes created from adult stem cells are currently being experimentally used, but as they cannot yet be produced in large amounts, the procedure is expensive.

With their huge capacity to proliferate, embryonic stem cells, which can be manipulated to form almost any type of mature cell, offer the possibility of high-volume production of cartilage cells. Their use would also be cheaper and applicable to greater number of arthritis patients, the researchers claim.

Osteoarthritis affects more than eight million people in the UK, and is a major cause of disability. It occurs when cartilage at the ends of bones wears away causing joint pain and stiffness.

"Current treatments of osteoarthritis are restricted to relieving painful symptoms, with no effective therapies to delay or reverse cartilage degeneration. Joint replacements are successful in older patients but not young people, or athletes who've suffered a sports injury," added Director of Research at Arthritis Research UK, Dr Stephen Simpson, added.

Nanoparticles could impact medication compliance in cornea transplants

Johns Hopkins Medicine researchers may have discovered a way to prevent rejection by using biodegradable nanoparticles that release needed medication into the eye after surgery. This discovery could solve the decades-old issue of medication compliance and help patients achieve corneal transplant success.

About 48,000 corneal transplants are done each year in the US, compared to approximately 16,000 kidney transplants and 2,100 heart transplants. Of the 48,000 corneal transplants, 10% of them end up in rejection, largely due to poor medication compliance. This costs the health care system and puts undue strain on clinicians, patients and their families.

"About 60 to 80% of patients don't take medicine the way they are supposed to," says Walter Stark, M.D., chief of the Division of Cornea, Cataract and External Eye Diseases at Johns Hopkins.

In an animal study published in *Journal of Controlled Release*, researchers looked into ways to alleviate the strain of adhering to a post-surgery treatment regimen that is sometimes hard to manage.

Rats that underwent a corneal graft surgery were randomly divided into four groups and were given various treatments. One group was injected weekly for nine weeks with a safe, biodegradable nanoparticle loaded with corticosteroids for timed release of medicine. The other three groups received weekly injections of saline, placebo nanoparticles and free dexamethasone sodium phosphate aqueous solution after surgery, respectively.

Treatments were given until the graft was clinically deemed as failed or until the nine-week test period concluded. Researchers looked at corneal transparency, swelling and growth of new blood vessels to decide if a graft had failed. For rats that received the nanoparticle loaded with corticosteroids, 65% of the treatment remained in the eye and did not leak within one week of the surgery. The concentration of the treatment also remained stronger than in the other three treatment groups. Additionally, there were no signs of swelling, and the cornea was clear throughout the test period. There were also far fewer instances of unwanted growth of new blood vessels in this group.

Two weeks after surgery, rats that received the placebo nanoparticle and saline injections had severe swelling, opaque corneas and unwanted growth of new blood vessels, all indicating graft failure. After four weeks, rats that received free dexamethasone sodium phosphate aqueous solution all had graft failure as well. The only group that showed successful corneal transplant was the group of rats that received the corticosteroid-loaded nanoparticle injections. The grafts were still viable in 100% of these rats.

The steroid-loaded nanoparticle treatment group showed no signs of corneal transplant rejection. "That's 100% efficacy, a very promising finding," says Justin Hanes, Ph.D., director of the Center for Nanomedicine. "This type of treatment may also help prevent corneal transplant rejection in humans while making medicine adherence much easier on patients and their families."

The nanoparticle loaded with medication could eliminate the need for a patient to remember to take their medicine –often multiple doses per hour –after a surgery, alleviating compliance risk. These types of drug delivery systems could be paired with other drugs and used in other conditions, such as glaucoma, macular degeneration and corneal ulcers, among others.

Funding of this study came from the Raymond Kwok Family Research Fund, a grant from the King Khaled Eye Specialist Hospital of Saudi Arabia and the Eye Bank Association of America/Richard Lindstrom Research Grant 2012.

Cardiovascular risks among obese adolescents assessed

Cardiovascular risks of severe paediatric obesity, assessed among adolescents participating in the "Teen Longitudinal Assessment of Bariatric Surgery" (Teen-LABS) study, were published this week in JAMA Pediatrics. Teen-LABS is a multi-centre clinical study funded by the National Institute of Diabetics and Digestive and Kidney Diseases (NIDDK) at the National Institutes of Health (NIH) that is examining the safety and health effects of surgical weight loss procedures.

"This NIH-funded study will add important knowledge to the field of severe obesity during adolescence and the effects of bariatric surgery," said Dr Marc P. Michalsky, MD, FACS, FAAP, surgical director of the Centre for Healthy Weight and Nutrition at Nationwide Children's and Associate Professor of Clinical Surgery and

Pediatrics at The Ohio State University College of Medicine. "Collaborating with colleagues around the country in a study of this magnitude to gather critical data defining cardiovascular disease (CVD) and other health risks, is both gratifying and hugely important. The results of this study will improve our understanding of the significant medical challenges faced by severely obese teens as well as document outcomes following surgical weight loss."

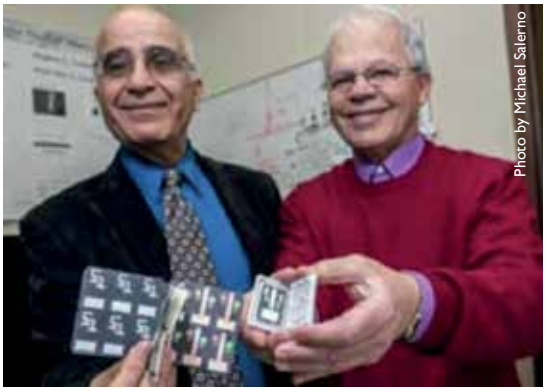
In this most recent publication from the Teen-LABS research study, investigators note that while paediatric obesity is more common now than in previous decades, very little is known about the CVD risks in the most severely obese teens. The main goal of the current publication was to assess the baseline prevalence and predictors of CVD risks among severely obese adolescents before undergoing weight-loss surgery.

The authors of this publication found that severely obese adolescents carry not only excess weight, but also have much higher risk for CVD than previously realized. Of the 242 participants in the Teen-LABS cohort, 95% had at least one CVD risk factor. Seventy-five percent had elevated blood pressure (including hypertension and pre-hypertension), 50% had unhealthy cholesterol levels, and nearly three-quarters of the group were insulin resistant. Importantly, the study also confirmed that increasing weight in teenagers is associated with increases in blood sugar and blood pressure.

While the majority of study participants are female, researchers found an interesting link between gender and CVD. "We found that adolescent boys were at a markedly higher risk compared with adolescent girls for abnormal triglyceride levels," said Dr Michalsky. "Among severely obese adolescents, recognition and treatment of CVD risk factors is important to help limit further progression of disease."

URI researchers invent lab-on-paper for rapid, inexpensive medical diagnostics

A team of University of Rhode Island (URI) engineers led by Professor Mohammad Faghri has created a new paper-based platform for conducting a wide range of complex medical diagnostics.



URI engineering professors Mohammad Faghri (left) and Constantine Anagnostopoulos pose with their lab-on-paper technology for medical diagnostics.

The key development was the invention of fluid-actuated valves embedded in the paper that allow for sequential manipulation of sample fluids and multiple reagents in a controlled manner to perform complex multi-step immune-detection tests without human intervention.

Faghri said the platform technology can be potentially applied to a wide variety of medical diagnostics, from Lyme disease and HIV to Ebola and malaria. "If someone comes up with a new biomarker for detecting a disease, we can create a test for it using our platform," he said. He also envisions applications in the veterinary medicine field, as well as for the detection of environmental contaminants and biological or chemical threats. "It could even be used at airports to test fluids for possible bioterror agents," he added.

A number of companies have already expressed interest in adapting various applications to the new platform. A strong patent with broad claims has been issued by the US Patent and Trademark Office for this technology, and two more are pending.

According to Faghri, paper-based lateral flow test strips, such as for pregnancy tests, have been commercially successful for many years. In these devices, a sample fluid wicks along a strip of paper, reacts with embedded reagents, and produces a coloured signal result. However, more complex medical diagnostics such as enzymatic assay protocols require multiple reagents triggered at particular times during the process, which can only be accomplished autonomously using the proprietary microfluidic valve technology created by the URI research team.

"We combined the well-established test strip technology, micro-patterning techniques and our innovative paper-based valves to create a new class of strip tests capable of autonomously handling multiple reagents," explained Faghri. "The sample fluid activates the flow of reagents in a predetermined sequence and time. When combined with an optical reader, which could even be a conventional smart phone, the lab-on-paper device provides accurate quantitative results.

"We're the only research group in the world to have created fluidic valves on multilayered paper without the use of external mechanical, electric or magnetic force and to use these valves to create fluidic circuits similar to electrical circuits," he added.

The lab-on-paper devices are constructed with multiple layers of paper printed with wax to create a three-dimensional structure of valves and channels along which the fluid travels, triggering the reagents at the appropriate time and generating a result.

Faghri and collaborator Constantine Anagnostopoulos, a URI adjunct professor of mechanical engineering, established a start-up company, Labonachip LLC, to commercialize their technologies. Anagnostopoulos serves as the company's president.

"Our next step is to find investors to help take us to the next level," said Anagnostopoulos.

The researchers have already succeeded in performing a feasibility study of their technology by detecting a biomarker for sepsis, a life-threatening complication from an infection. ProThera Biologics, a Providence-based company co-founded by Brown University Professor Yow-Pin Lim, identified a biomarker that indicates a patient is going into shock from sepsis, and

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the company has collaborated with Faghri and Anagnostopoulos to develop a paper-based rapid test using this biomarker.

The researchers are working with the University of Rhode Island Research Foundation to identify potential partners.

"A number of diagnostics companies are currently evaluating this lab-on-paper microfluidics technology as the industry moves from lab-based testing to point-of-care rapid, autonomous diagnostics," said Gerald Sonnenfeld, chairman of the URI Research Foundation and URI's vice president of research and economic development. "We expect the point-of-care testing market to expand greatly over the next several years."

Scientists crack a piece of the neural code for learning and memory

In a work published in *Nature*, researchers at Cold Spring Harbor Laboratory (CSHL) describe how post-mortem brain slices can be "read" to determine how a rat was trained to behave in response to specific sounds before it died. The work provides one of the first examples of how changes in the activity of individual neurons encode learning and memory in the brain.

Researchers have long hypothesized that changes in neuronal activity are responsible for our ability to make decisions, remember things, and learn. "Neuroscientists have previously identified brain areas involved in learning something," says CSHL Professor Anthony Zador, who led the team of researchers on this current work. "But we wanted to drill down further and identify how changes at specific connections encode a particular behavioral response."

To do this, the team focused on how rats translate sound cues into behaviour. The researchers trained rats to associate a specific tone with a reward. Changes in the tone – like the difference between a tuba and a flute – signalled the animal to look for the reward either on the left or right side of a training box.

In previous work, the team discovered that activity in specific populations of neurons was crucial for animals to perform the task. This neuronal population transmitted information from one auditory brain region (the auditory cortex) to another (the auditory striatum).

In the current work, the team measured the strength of the connections between these two populations of neurons, as animals learned the task. "We found that there was a gradient in activity across the auditory striatum that corresponded to whether the animal was trained to go left or right for their reward," explained Zador.

Based upon this information, the team reasoned that they might be able to use post-mortem brain slices to "predict" (obviously, in retrospect) how these or other rats had been trained. As Zador describes, "We were amazed that in all cases, our predictions – left or right – were correct. We had deciphered a tiny piece of the neural code with which the animal encoded these memories. In essence, we could read the minds of these rats."

According to Zador, the results are likely to be broadly applicable to other senses and parts of the brain. "We are excited to apply this method to more complex forms of learning, and to other sensory systems, like vision."

The paper, supported by grants from the US National Institutes of Health and the Swartz Foundation, can be obtained online at: *http://dx.doi.org/10.1038/nature14225*

Vitamin D deficiency linked more closely to diabetes than obesity

People who have low levels of vitamin D are more likely to have diabetes, regardless of how much they weigh, according to a new study published in the Endocrine Society's *Journal of Clinical Endocrinology & Metabolism*.

The results help clarify the connection between vitamin D, obesity and diabetes. According to the Society's Scientific Statement on the Noon-skeletal effects of vitamin D, studies have found that people who have low levels of vitamin D are more likely to be obese. They also are more likely to have Type 2 diabetes, pre-diabetes and metabolic syndrome than people with normal vitamin D levels.

Vitamin D helps the body absorb calcium and maintain bone and muscle health. The skin naturally produces this vitamin after exposure to sunlight. People also absorb smaller amounts of the vitamin through foods, such as milk fortified with vitamin D. More than one billion people worldwide are estimated to have deficient levels of vitamin D due to limited sunshine exposure.

"The major strength of this study is that it compares vitamin D levels in people at a wide range of weights (from lean to morbidly obese subjects) while taking whether they had diabetes into account," said one of the study's authors, Mercedes Clemente-Postigo, MSc, of Instituto de Investigación Biomédica de Málaga (IBIMA) at Complejo Hospitalario de Málaga (Virgen de la Victoria) and Universidad de Málaga in Malaga, Spain.

The cross-sectional study compared vitamin D biomarkers in 118 participants at the university hospital Virgen de la Victoria in Malaga as well as 30 participants from the Hospital Universitari Dr. Josep Trueta in Girona, Spain. All participants were classified by their body-mass index (BMI) as well as whether they had diabetes, pre-diabetes or no glycaemic disorders. Researchers measured levels of vitamin D in the participants' blood streams and vitamin D receptor gene expression in adipose tissue.

The analysis found that obese subjects who did not have glucose metabolism disorders had higher levels of vitamin D than diabetic subjects. Likewise, lean subjects with diabetes or another glucose metabolism disorder were more likely to have low levels of vitamin D. Vitamin D levels were directly correlated with glucose levels, but not with BMI.

"Our findings indicate that vitamin D is associated more closely with glucose metabolism than obesity," said one of the study's authors, Manuel Macías-González, PhD, of Complejo Hospitalario de Málaga (Virgen de la Victoria) and the University of Málaga. "The study suggests that vitamin D deficiency and obesity interact synergistically to heighten the risk of diabetes and other metabolic disorders. The average person may be able to reduce their risk by maintaining a healthy diet and getting enough outdoor activity."

The study, "*Serum 25-Hydroxyvitamin D and Adipose Tissue Vitamin D Receptor Gene Expresion: Relationship with Obesity and Type 2 Diabetes*," was published online, ahead of print. MEH

Healthcare facilities struggle in face of conflict

Populations in the capital city of Sana'a and 13 of Yemen's 22 governorates have been affected by the violence, and the escalation in conflict and violence has placed immense strain on health facilities and humanitarian healthcare providers, according to the Office of the Co-ordination of Humanitarian Affairs.

"Communities across Yemen have been caught up in attacks and crossfire, endangering the lives and health of the young and old, and even people already displaced by violence," according to Dr Ahmed Shadoul, WHO Representative in Yemen.

In areas where violence is ongoing, some hospitals are functioning at minimum capacity. The country's second largest hospital in Sana'a City has been partially evacuated due to its proximity to a military base, and full evacuation is expected to take place soon.

Hospitals in all affected governorates are in urgent need of oxygen supplies, medicines and supplies for treating trauma wounds, chronic diseases, life-saving equipment and medicines, additional health staff and additional bed capacity. Due to the violence, there are also concerns about the ability of ambulances and other vehicles to transport injured people to hospitals to receive care, as well as the availability of fuel for ambulances and hospital generators.

Supplies are expected to decrease further as local stocks run low and access to Yemen through airports and seaports remains closed.

WHO, in support of Yemen's Ministry of Public Health and Population, is working with the International Committee for the Red Cross, Médecins Sans Frontières (MSF France and Spain) and other partner organizations to ensure that patients receive the treatment they urgently need and that health facilities are provided with sufficient medicines and medical supplies.

Since the conflict escalated on 19 March, WHO has provided eight inter-agency health kits for 240,000 beneficiaries throughout the country from its warehouses in Sana'a, Aden and Hodeidah. WHO has also provided trauma kits for 400 major operations, 11,000 blood bags, IV fluids, analgesics, oxygen supplies and dressing materials to 18 hospitals throughout the country, and is in the process of locally procuring an additional 10 trauma kits for the 1,000 major operations.

With the closure of all airports and ports to Yemen, WHO is co-ordinating with the World Food Programme and UN partners to explore alternative solutions for the provision of additional medicines and medical kits from its humanitarian hub in Dubai.

Given the frequent power cuts in Aden, WHO is exploring options with the Ministry of Public Health and Population for locally procuring generator sets to maintain the cold chain for vaccines, although shortages in fuel are creating additional challenges. To ensure that referral services are available where needed most, WHO is co-ordinating with the Ministry to relocate ambulances to governorates with the largest numbers of injured patients. WHO is also covering the operational costs of the ambulances and installing GPS tracking devices in the vehicles to prevent their misuse. Additional ambulances are also needed, according to the Ministry, and the WHO has pre-positioned additional interagency health kits and trauma kits in its humanitarian hub in Dubai for transporting to Yemen as soon as possible.

"We are in daily contact with the Ministry of Public Health and Population and all health partners on the ground in Yemen to monitor all gaps in healthcare services, and ensure that we are able to respond quickly. We have been able to fill most reported shortages for the time being, but the needs are huge and the sooner we are allowed to send additional supplies into the country without restrictions in access, the more lives we can save," said Shadoul. MEH

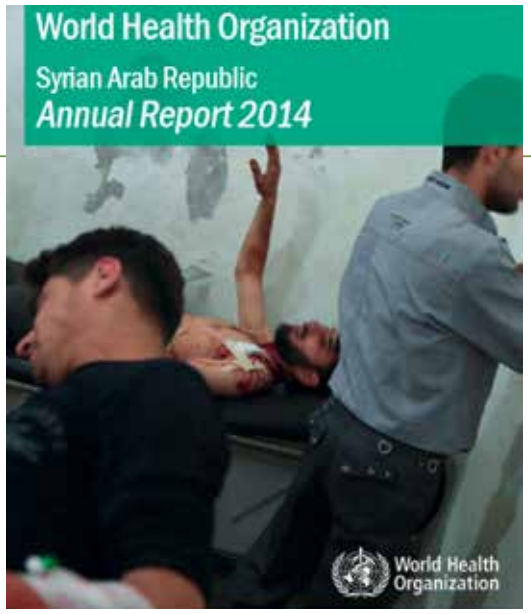
Healthcare workers killed

In a statement issued on 6 April, the WHO said it deplored the deaths of healthcare workers and damages to health facilities in Yemen as a result of the ongoing conflict, and expressed concern about the serious implications of these attacks.

On 4 April, two volunteer paramedics with the Yemen Red Crescent Society in Aden were shot when their ambulance was hit by gunfire. The paramedics, who were brothers, died from their injuries on their way to hospital. On 30 March, a volunteer ambulance driver with the Yemen Red Crescent Society was killed after his vehicle was hit by gunfire in Al Dhale'e in southern Yemen. Three ambulances operated by the Ministry of Public Health and Population were taken by armed forces in Aden on 1-2 April and used for non-medical purposes.

One security guard was killed and two nurses were injured in the health centre of Al-Mazraq camp for internally displaced persons in Haradh, Hajja Governorate. The centre, which is operated by the health ministry and supported by WHO, was partially damaged. In Sana'a, the Science and Technology Hospital was hit by shrapnel on 1 April, resulting in injuries to three hospital employees and five family members of patients.

Millions face health crisis after deadliest year



The security situation in the Syrian Arab Republic remains critical. In 2014, the ongoing crisis affected the health and well-being of millions of Syrians. Tens of thousands of people, especially in Idleb, Dier ez-Zor, Al Hassakeh, Aleppo, Homs, Rural Damascus, Lattakia and Tartous, have been internally displaced, and more than 76,000 people, including over 3,500 children, have been killed. This year was the deadliest since the crisis began in 2011.

It has been estimated that currently more Syrians die as a result of inadequate health care than as a direct consequence of the ongoing conflict.

The overall health and humanitarian situation in Syria has severely deteriorated as the prolonged conflict continues to affect every aspect of life across the country. The entire population has been affected politically, economically and socially, and the widespread damage to the national health system, water supply and sanitation infrastructures has compounded the suffering and despair. The UN estimated that the total number of people in need of humanitarian assistance in Syria has reached 12.2 million. Syria now has more IDPs – around 7.6 million – than any other country. The Internal Displacement Monitoring Centre estimates that 9,500 Syrians are displaced each day. The number of Syrian refugees in the neighbouring countries of Egypt, Iraq, Jordan, Lebanon and Turkey has reached a staggering 3.8 million.

Over 200,000 people have been killed since the crisis started. Many of the 750,000 people who have been injured have not received rehabilitative care for traumatic injuries due to the lack of healthcare services, and will suffer lifelong disabilities as a result. "While the numbers of sick and wounded have increased during the war, a great many doctors have left the country due to the security situation".

Public hospitals in Damascus have become overstretched as people from governorates such as al Hassakeh, Dier ez-Zor, Ar Raqqa, Aleppo, Idleb, and Hama flood into the capital city in search of health care. "The capital has become the last place to seek treatment. It is handling the patient load of at least 10 provinces," laments a doctor in Damascus.

What's being done...

The number of people who received treatments rose from 6.1 million in 2013 to over 13.8 million in 2014. Around 2.9 million children under five, including almost half a million in hard-to-reach and opposition-controlled areas, were vaccinated against polio in November 2014. Almost one third of WHO's supplies and equipment were delivered to hard-to-reach and opposition-controlled areas including Aleppo, Al Hassakeh, Ar Raqqa, Dara'a, Dier ez-Zor, Idleb, and Rural Damascus. Herd immunity against measles improved as a result of the vaccination of 1.1 million children between six months and 15 years old in a nationwide campaign in June 2014. Around 900,000 patients in secondary and tertiary hospitals in Aleppo, Douma, Rural Damascus and Qamishli were treated with medicines and supplies donated by WHO.

It has been estimated that currently more Syrians die as a result of inadequate health care than as a direct consequence of the ongoing conflict.

The number of Early Warning Alert and Response System (EWARS) sentinel sites rose from 441 in 2013 to 650 in 2014, with a third in opposition-controlled areas. As a result of WHO's strategic partnership with 56 NGOs, three million people in need received health care.

WHO mapped the status of functionality of all 113 public hospitals and 92% of the country's 1,750 public health centres.

Disease trends in 2014

- 1 case of polio
- 31,460 cases of Hepatitis A
- 4,352 cases of measles

Key capacity building workshops in 2014

- 840 healthcare workers were trained on trauma management
- 285 healthcare workers were trained on infection control
- 2,783 healthcare workers across the country were trained on HeRAMS
- 1,913 health workers were trained on the management of acute malnutrition
- 570 non-specialised health workers were trained to integrate MH services at PHCs
- 4,000 healthcare workers were trained on early detection of diseases

Turning points in 2014

Polio: Syria has been polio-free for one year. The last case of polio in Syria was diagnosed in January 2014 as a result of numerous polio campaigns.

Secondary/Tertiary Care: The Essential Medicines List (EML) 2014 was developed by WHO. This enhanced the quality and standard of medicines and helped to limit the introduction and sale of counterfeit medicines.

The Early Warning Alert and Response System (EWARS): Over 90% of all reported cases of epidemic-prone diseases, including polio, measles and pertussis, were investigated within 48 hours.

Health Resources Availability Mapping System (HeRAMS): All 113 public hospitals and 92% of 1,750 PHCs were assessed for functionality and accessibility, yielding valuable data for informed decision-making.

Mental health: Basic mental health services were offered for the first time in PHC centres in 2014.

Capacity building: To fill the gap created by the exodus of health professionals, WHO trained 17,000 health workers on various areas including immunization, mental health, nutrition, secondary and tertiary care, health information management, chemical hazards and the management of civil society projects.

Access to treatment: Over 13.8 million people benefited from 246 shipments of medicines, supplies and equipment distributed

The way forward

With the crisis approaching its fifth year, the disruption of humanitarian services is worsening, bringing greater risks for all Syrians, especially IDPs and those in besieged areas. The health sector in Syria will require US$182,228,869 in 2015, of which WHO will require US$116,377,945 in order to continue providing essential health care to increasingly vulnerable people across the country. Based on lessons learnt in 2014, WHO is pursuing the following strategic areas for 2015:

Trauma care

- Strengthen trauma preparedness and management for an increasing number of injuries across the country; train healthcare providers, especially surgeons and emergency specialists.
- Expand partnerships with emergency healthcare providers.
- Launch a comprehensive physical rehabilitation programme that will include training of physical rehabilitation and prosthetics specialists and the donation of supplies to manufacture artificial limbs and prosthetics. Funds needed: US$27,071,000

Enhance PHC

- Improve access to comprehensive PHC services, including reproductive healthcare and vaccination services.
- Continue to implement polio campaigns in the first half of 2015, with special focus on hard-to-reach areas.
- Review the implementation of the six-month plan for strengthening routine immunization in order to fill gaps identified in 2014. Funds needed: US$35,556,200

Secondary and Tertiary Care

- Develop the Essential Medicines List for 2015 in collaboration with all health partners.
- Assess needs for secondary and tertiary care services.
- Rehabilitate infrastructures in partially damaged hospitals.
- Provide antibiotics, anaesthetics, analgesics, IV fluids, and treatments for renal failure, cancer and haemodialysis. Funds needed: US$32,468,080

Mental Health

- Expand the integration of mental health services in general hospitals and PHC centres.
- Train non-specialized health workers and support them with follow-up on-the-job training and supervision.
- Adapt the Arabic audio toolkit and reading materials for use in community-based mental health care services. At least 125,000 people will benefit from these training materials. Funds needed: US$6,152,000

Nutrition

- Issue updated WHO guidelines for the management of SAM to reinforce technical support to stabilization centres.
- Expand nutrition surveillance to about 200 PHC centres so as to generate comprehensive information on the nutrition status of the target population across the country.
- Collaborate with SARC and NGOs to screen children in hard-to-reach areas.
- Promote infant and young children nutrition practices in all WHO-supported nutrition activities.
- Integrate early childhood development activities within emergency nutrition programmes. Funds needed: US$1,551,500

WASH

- Improve water supply and hospital hygiene conditions in functional public and NGO hospitals in Syria.
- Further strengthen WPARS (workload partitioning) in collaboration with MoWR (Ministry of water resources) and MoH in order to mitigate and respond to water pollution cases. Funds needed: US$5,690,000 Annual Report 2014 56 NGO Partnerships
- Expand WHO's partnerships with civil society organizations across the country to extend health services to more hard-to-reach areas.
- Continue to train NGOs on project management and evaluation.
- Develop a database on NGOs providing health services, together with a dynamic platform for communication. Funds needed: US$9,150,000

CrossLine

- WHO's office in Damascus will continue to co-ordinate with health partners in Jordan and southern Turkey to complement and synergize the emergency response through sharing of information on the epidemiological situation, the status of healthcare facilities, and emerging needs.
- WHO will also continue to engage in high-level advocacy and negotiations with the Government of Syria, including the Office of the President, the Ministry of Foreign Affairs, the MoH and other stakeholders to improve the delivery of health and humanitarian assistance to all governorates including hard-to-reach and opposition-controlled areas. (The funds required for the above activities have been subsumed under the intervention areas listed above.)

EWARS

- Expand EWARS sites to include all public healthcare facilities.
- Expand the list of notifiable communicable diseases to be reported under EWARS.
- Develop a web-based application for reporting all communicable diseases, using the EWARS database as a platform.
- Improve M&E for EWARS. Funds needed: US$ 5 136 000

HeRAMS

- Conduct additional training workshops on HIS at governorate and health district levels.
- Upgrade communications and computer equipment to improve tele-reporting from hard-to-reach and difficult areas.
- Automate data generation and collection.
- Expand the reporting sites to include SARC and NGO clinics and selected private hospitals. Funds needed: US$777,275

by WHO across all 14 governorates of Syria. Almost one third of these supplies were delivered to opposition-controlled areas.

Strategic partnership: WHO established 62 co-operation agreements with 56 NGOs. Just under one third of these NGOs are operating in hard-to-reach and opposition-controlled areas. Of all the humanitarian sectors operating across Syria, the health sector has the highest number of NGO partners.

Innovation: Innovative M&E approaches have been implemented to track results. These include WHO's supply tracking system, health information system, and other standardized data collection tools.

on the WEB WHO Syrian Arab Republic – Annual Report 2014
http://tinyurl.com/qbnclpo

Has Syria really beaten polio?

The World Health Organization has announced that Syria has seen no new cases of polio in the past year, but some health experts question the quality of the surveillance that led to this conclusion. **Danya Chudacoff** and **Louise Redvers** of IRINnews report.

Just 10 months ago, a UN official labelled the outbreak in Syria, and its subsequent spread to Iraq, as "the most challenging … in the history of polio eradication".

The re-surfacing of the virus in Syria after a 14-year absence led to a huge immunisation campaign in which health workers and volunteers risked their lives to deliver vaccines and take samples in the midst of a full-scale conflict.

But does the good news headline tell the whole story? Can Syria really go from 36 new cases in 2013, to one case in 2014 and zero twelve months later? How can officials be so sure?

"The absence of laboratory evidence of polio does not mean the absence of polio," said Annie Sparrow, assistant professor of global health and deputy director of the Human Rights Program at Icahn School of Medicine at Mount Sinai in New York City, who for the past year has been advising Syrian opposition aid workers on polio response.

Central to the doubts are shortcomings in surveillance, including delayed and incomplete testing and verification of suspected polio cases. In March, at a regional polio review conference held in the Lebanese capital Beirut, experts said the successes of the past year were no indication that the battle against polio in Syria or Iraq had been won.

A returning menace

In October 2013, more than two years into its civil conflict that limited access to healthcare and destroyed distribution networks, Syria confirmed its first case of wild poliovirus since 1999. Within five months, the number of confirmed cases had risen to 36 and in March 2014 a case was picked up across the border in Iraq.

The re-surfacing of polio – an incurable and debilitating, but easily preventable, disease – sent shock waves through the Middle East and sparked a mass regional vaccination effort targeting more than 27 million children in eight countries.

Polio, which is waterborne, thrives in areas of poor sanitation, malnutrition and weak public health systems. Conflict-hit Syria and Iraq as well as neighbouring countries hosting refugees are ideal breeding grounds.

"The absence of laboratory evidence of polio does not mean the absence of polio"

A lack of co-ordination for political reasons between aid agencies working through the government-controlled capital Damascus and those crossing the border from Turkey into the rebel-held north further complicated the response.

Sparrow, a well-known critic of WHO in Syria, told IRIN that while the Assistance Co-ordination Unit, the Syrian opposition's humanitarian aid arm, had done "fantastic work", it came up against access and other challenges that limited its capacity to get stool samples to laboratories.

"In settings of conflict and insecurity, we cannot rely on a laboratory diagnosis of polio and that is a very clear gap," she said.

She also expressed low confidence in the accuracy of data collection and reporting on polio by the Syrian government. When the first cases were identified in Deir-ez-Zor province, she said, officials tried to deny they were polio.

To confirm polio requires two stool samples taken from the infected child within 24 hours of each other and within 14 days of the onset of acute flaccid paralysis, or AFP, one of the earliest signs of polio as well as other viruses. Stool samples must be preserved at a certain temperature and transported to an accredited regional lab – either in Damascus or the Turkish capital Ankara – within 72 hours to be valid.

Because of the lack of adequate facilities and the logistical challenges of correctly sampling and diagnosing the poliovirus in a war zone, many cases cannot be fully confirmed.

According to Bashir Tajaldin, an epidemiologist based in the southern Turkish city of Gaziantep, who has worked for ACU and its Early Warning Alert and Response Network (EWARN), during 2014 only 62 percent of cases of AFP observed in Syria's opposition-held north were successfully tested for polio.

This marked a huge improvement over the 2013 rate of 17 percent, but still left more than one-third of cases untested, he said.

A long track

The EWARN system and the ACU-led Polio Task Force (PTF), which together track cases and co-ordinate the immunisation campaign in Syria's opposition-held north, are based in southern Tur-

key, relying on an imperfect network of health facilities and volunteers inside Syria for inoculation and reporting.

This EWARN sentinel surveillance system doesn't get reports from all facilities. Although the number of health facilities in northern Syria reporting to EWARN has grown from 70 in mid-2013 to more than 300 in November 2014, the total number of operational facilities in the area is unknown. As such, some cases could be occurring without being recorded or reported, Tajaldin said.

While the WHO-backed EWARN system has not recorded any confirmed cases of polio in the past year, at least four so-called 'compatible' cases (where patients showed paralysis and other symptoms) were registered, he said.

"A 'compatible' [case] doesn't necessarily mean it is polio; the vast majority [are] not," Chris Maher, manager for polio eradication and emergency support at WHO, told IRIN. "But because you don't have adequate specimens and can't come up with an alternative diagnosis, you also can't exclude it from being polio."

"When you're near eradication, you want to prove… every last case," Sparrow cautioned.

The stigma around polio and the disabilities it causes also play a factor in people being reluctant to come forward for testing.

"People are not just afraid. Many of these areas are tribal, and often [these communities] don't support getting medical consultation," said Tajaldin, now medical coordinator at the Canadian International Medical Relief Organization (CIMRO) in Gaziantep.

In November 2013, the PTF launched a six-round vaccination campaign targeting 1.5 million children in the country's seven northern governorates. A similar campaign was held in government-controlled areas, implemented by WHO and monitored by a parallel surveillance system: the Early Warning and Response System (EWARS), distinct from EWARN.

Across Syria's opposition-held north, where some of the conflict's most intense fighting takes place and where extremist groups like the self-proclaimed Islamic State (IS) hold large swathes of territory, some 8 500 local volunteers were mobilised to go door-to-door delivering the vaccines.

Each vaccine consists of two drops administered orally, with three rounds usually required for full immunization. But given insecurity and massive population movement, the campaign aimed for at least six rounds to ensure near-total coverage.

Difficulties

Yet, despite the impressive rollout, organisers struggled to track vaccination rates from round to round. Monitors inevitably faced the same challenges as vaccinators in accessing some of the hardest-to-reach areas, such as those under siege, according to aid workers who spoke to IRIN.

The Qatar Red Crescent, which monitored the campaign, said coverage reached 94 percent in northern opposition-held areas.

The consensus from the Beirut review was "cautious optimism" that the polio threat in the region is over, Maher said, while admitting "we would never make the claim that coverage in Syria is over 90 percent everywhere."

Volunteers are gearing up for additional rounds of vaccination beginning next month while donors and health officials continue to keep an eye on campaign indicators.

"We have a lot of work ahead of us, and the third phase of the [campaign] will be implemented in the first half of 2015," Maher said. "Still, the weight of the evidence is that by some miracle we have averted a massive polio outbreak in the Middle East." – *www.irinnews.org* MEH

Polio and the Islamic State

An unexpected success of the polio immunisation campaigns in Syria and Iraq has been the access granted to vaccinators in territory controlled by the militant group calling itself the Islamic State (IS).

While IS-controlled areas have been largely inaccessible to international aid interventions, the militants did allow the Polio Task Force in Syria, led by the Syrian opposition's humanitarian aid arm – the Assistance Coordination Unit (ACU), to carry out immunisation campaigns there.

"There was a general level of acceptance and demand by the local population [for the vaccinations]. It would have been difficult for IS not to allow it," a director of an international aid organisation working in Syria told IRIN.

"We told them, 'This polio – it doesn't care about lines. It goes cross-line and cross-border as it wants," explained Sharvan Ibesh, the head of Buhar Relief Organization, an NGO working in the northern province of Aleppo.

According to Syed Jaffar Hussain, head of the WHO in Iraq, immunisation teams were able through local partners to deliver vaccines into IS-held parts of Mosul and Anbar provinces.

A WHO Eastern Mediterranean Public Health Network (EMPHNET) and UNICEF review of the seven vaccination campaigns carried out last year in Iraq was completed in early January and recorded nationwide vaccination reach of 95%.

"We were fearing the worst but with the aggressive response that the government and partners were able to put in place it can be seen that the circulation of the virus has been stopped," said Hussain, noting that in Iraq only two cases had been picked up, the last one in April 2014.

on the WEB Aid and the Islamic State
http://tinyurl.com/060wwkw

International spread of virus remains a threat, says WHO

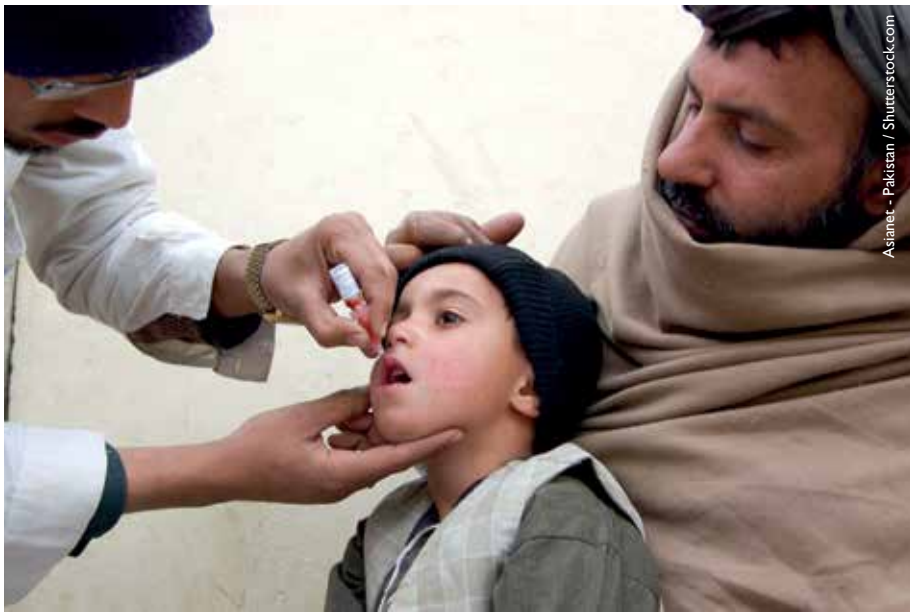
The fourth meeting of the Emergency Committee under the International Health Regulations (IHR) (2005) regarding the international spread of wild poliovirus in 2014 - 15 was convened via teleconference by the Director-General on 17 February 2015.

The following IHR States Parties submitted an update on the implementation of the Temporary Recommendations since the Committee last met on 13 November 2014: Cameroon, Equatorial Guinea, Pakistan and the Syrian Arab Republic.

The Committee noted that the international spread of wild poliovirus has continued with one new exportation from Pakistan into Afghanistan documented after 13 November 2014. The Committee assessed the risk of international spread from Pakistan to be sustained. The Committee appreciated that Pakistan has prepared a new robust 'low-season' vaccination plan, established national and provincial emergency operations centres, and resumed campaigns in South and North Waziristan. Nonetheless, the principle factors underpinning the international spread of wild poliovirus from Pakistan have not yet changed sufficiently since 13 November 2014.

There has been no other documented international spread of wild poliovirus since March 2014. Although the risk of new international spread from the nine other infected Member States appears to have declined, the possibility of international spread still remains a global threat worsened by the expansion of conflict-affected areas, particularly in the Middle East and Central Africa. Furthermore, countries affected by conflict inevitably experience a decline in health service delivery.

The Committee assessed that the spread of polio still constitutes a Public Health Emergency of International Concern and recommended the extension of the Temporary Recommendations for a further three months. The Committee considered the following factors: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1. The continued international spread of wild poliovirus through 2014;
2. The risk and costs of failure to eradicate globally one of the world's most serious vaccine-preventable diseases;
3. The continued necessity of a co-ordinated international response to stop the international spread of wild poliovirus and to prevent new spread with the onset of the high transmission season in May/June 2015;
4. The serious consequences of further international spread for the increasing number of countries in which immunization systems have been disrupted by armed conflict and complex emergencies;
5. The importance of a regional approach and co-operation across borders.

The Committee sincerely appreciated the efforts that all countries have made, but remains concerned that implementation of the Temporary Recommendations is incomplete.

The Committee provided the Director-General with advice aimed at reducing the risk of the international spread of wild poliovirus, based on an updated risk stratification of the 10 countries that had earlier met the criteria for 'States currently exporting wild poliovirus' or 'States infected with wild poliovirus but not currently exporting'.

A third risk category has been added by the Committee for 'States no longer infected by wild poliovirus, but which remain vulnerable to international spread'. The Committee recommended that countries apply a regional approach and develop joint immunisation strategies with neighbouring countries.

States currently exporting wild poliovirus

Cameroon (until 11 March), Equatorial Guinea (Until 4 April), Syrian Arab Republic (until 17 March) and Pakistan should:

- Officially declare, at the level of head of state, that the interruption of poliovirus transmission is a national public health emergency.
- Ensure that all residents and long-term visitors (i.e. over four weeks) receive

a dose of OPV or inactivated poliovirus vaccine (IPV) between four weeks and 12 months prior to international travel;

- Ensure that those undertaking urgent travel (i.e. within four weeks), who have not received a dose of OPV or IPV in the previous four weeks to 12 months, receive a dose of polio vaccine by the time of departure as this will still provide benefit, particularly for frequent travellers;
- Ensure that such travellers are provided with an International Certificate of Vaccination or Prophylaxis in the form specified in Annex 6 of the International Health Regulations (2005) to record their polio vaccination and serve as proof of vaccination;
- Intensify cross-border co-ordination;
- Maintain these measures until the following criteria have been met: (i) at least six months have passed without new exportations and (ii) there is documentation of full application of high-quality eradication activities in all infected and high-risk areas; in the absence of such documentation these measures should be maintained until at least 12 months have passed without new exportations.

The Committee noted that by 11 March, 17 March and 4 April 2015, 12 months would have elapsed since any documented exportation from Cameroon, Syria and Equatorial Guinea, respectively. On these dates, should no further exportations occur, Cameroon and Equatorial Guinea will meet the criteria for States infected with wild poliovirus but not currently exporting and would be subject to the recommendations for this category of risk. Syria will meet the criteria for 'States no longer infected by wild poliovirus, but which remain vulnerable to international spread'.

Given the continued risk of international spread, both Cameroon and Equatorial Guinea should give special attention to:

- Enhancing regional co-operation and cross-border co-ordination to ensure prompt detection of wild poliovirus and vaccination of refugees and mobile population groups.

Pakistan should also:

- Restrict at the point of departure the international travel of any resident lacking documentation of polio vaccination;
- Note that the recommendation stated previously for urgent travel remains valid;
- Continue to provide to the Director-General a report on the implementation by month of the Temporary Recommendations on international travel;
- Intensify cross-border efforts by improving co-ordination with Afghanistan to increase vaccination coverage of travellers

States infected with wild poliovirus but not currently exporting

Afghanistan, Nigeria, Somalia, Ethiopia (until 16 March), Iraq (until 19 May), and Israel (until 28 April), should:

- Officially declare at the level of head of state or government, that the interruption of poliovirus transmission is a national public health emergency; where such declaration has already been made, this emergency status should be maintained.
- Encourage residents and long-term visitors to receive a dose of OPV or IPV four weeks to 12 months prior to international travel; those undertaking urgent travel (i.e. within four weeks) should be encouraged to receive a dose by the time of departure;
- Ensure that travellers who receive such vaccination have access to an appropriate document to record their vaccination status;
- Intensify cross-border co-ordination;
- Maintain these measures until: (i) at least six months have passed without the detection of wild poliovirus transmission in the country, and (ii) there is documentation of full application of high-quality eradication activities in all infected and high-risk areas; in the absence of such documentation these measures should be maintained until at least 12 months without evidence of transmission.
- Enhance regional co-operation and cross-border co-ordination.

The Committee noted that by 16 March, 28 April 2015 and 19 May, 12 months would have elapsed since the detection of wild poliovirus in Ethiopia, Israel and Iraq respectively. Should there be no further detection of wild poliovirus in Ethiopia by 16 March, in Syria by 17 March, in Israel by 28 April, and in Iraq by 19 May, these countries will meet the criteria for this category of risk and should:

- Intensify efforts to ensure vaccination of mobile and cross-border populations, Internally Displaced Persons, refugees and other vulnerable groups;
- Maintain these measures with documentation of full application of high-quality surveillance and vaccination activities for 12 months.

The Director-General endorsed the Committee's recommendations for 'States currently exporting wild polioviruses', for 'States infected with wild poliovirus but not currently exporting' and for 'States no longer infected by wild poliovirus, but remain vulnerable to international spread' and extended them as Temporary Recommendations under the IHR (2005) to reduce the international spread of wild poliovirus, effective 27 February 2015. A reassessment of this situation within the next three months was requested.

The Committee applied the following criteria to assess the 12-month period for detection:

States no longer exporting (detection of no new wild poliovirus exportation):

- **Wild Poliovirus Case:** 12 months after the onset date of the first case caused by the most recent exportation PLUS six weeks to account for case detection, investigation, laboratory testing and reporting period.
- **Environmental isolation of exported wild poliovirus:** 12 months after collection of first positive environmental sample in the country that received the new exportation PLUS four weeks to account for lab testing.

States no longer infected (detection of no new wild poliovirus):

- **Wild Poliovirus Case:** 12 months after the onset date of the most recent case PLUS six weeks for case detection, investigation, lab testing.
- **Environmental isolation of wild poliovirus:** 12 months after collection of the most recent positive environmental sample PLUS four weeks for lab testing. MEH

Countries cut smoking, but more action needed to meet 2025 target

New data shows a declining rate of tobacco use and an increase in numbers of non-smokers. But governments need to intensify action to combat the tobacco industry and dramatically reduce consumption of tobacco products to, in turn, protect public health, according to the World Health Organization.

"Globally, tobacco use accounts for at least 30% of all cancer deaths, causing 87% of lung cancer deaths in men, and 70% of lung cancer deaths in women. If we don't take action now, we will continue to suffocate under an enormous cloud of smoke, a cloud that impairs our vision and makes us unable to see the deadly consequences of tomorrow," said H.H. Sheikh Nahayan Mabarak Al-Nahayan, Minister of Culture, Youth and Community Development, opening the five-day 16th World Conference on Tobacco or Health (WCTOH) in Abu Dhabi, capital of the UAE, on 17 March.

The conference theme was Tobacco and Non-communicable Diseases, recognising for the first time that tobacco use in all its forms is the greatest risk factor contributing to the occurrence of non-communicable diseases (NCDs), including cancer, cardiovascular problems, lung disease and diabetes. Tobacco use now causes one in six of all NCD deaths and up to half of current tobacco users will eventually die of a tobacco-related disease.

According to the new online *WHO Gobal Report on Trends in Tobacco Smoking*, in 2010, there were 3.9 billion non-smokers aged 15 years and over in WHO Member States (or 78% of the 5.1 billion population aged 15+). This number is projected to rise to five billion (or 81% of the projected 6.1 billion population aged 15+) by 2025 if the current pace of tobacco cessation continues. This trend indicates countries are making inroads, but much greater action is needed to curb the tobacco epidemic if the global target to cut tobacco consumption by 30% by 2025 to reduce premature deaths from NCDs is to be met.

"In an ominous trend, in some countries the battle between tobacco and health has moved into the courts," says Dr Margaret Chan, WHO Director-General, who attended the conference. "Governments wishing to protect their citizens through larger pictorial warnings on cigarette packs or by introducing plain packaging are being intimidated by industry's threats of lengthy and costly litigation. This is an effort to deprive governments of their sovereign right to legislate in the public interest. We will push back hard."

A new study on global trends and projections for tobacco use published in *The Lancet* ahead of the WCTOH found that the prevalence of men smoking tobacco products has fallen in 125 countries between

2000 and 2010, and in 156 countries for women. However, based on current trends, only 37 countries are on track to achieve the 30% tobacco reduction target set out in the Global Action Plan for the prevention and control of NCDs 2013-2020.

"The global movement against the tobacco epidemic is strong, and the downward trends in tobacco use are a testament to that fact," says Dr Vera Luiza da Costa e Silva, Head of the WHO FCTC Secretariat. "We see many countries are taking steps to beat back the influence of the tobacco industry. But if we are to achieve targets set by governments to reduce tobacco consumption by 30% by 2025, intensified action will be needed to implement all the provisions of the WHO FCTC."

Improving tobacco control is one of the keys to addressing non-communicable diseases (NCDs), namely lung and heart diseases, cancers and diabetes. The latest WHO global status report on NCDs states that 38 million lives were lost to NCDs in 2012, with nearly three quarters occurring in low- and middle-income countries, and 16 million (42%) being premature (people dying before the age of 70 years) - up from 14.6 million in 2000. Tobacco accounts for about one in 10 deaths, and up to half of current users will die from the effects of tobacco consumption: or six million deaths per year.

"Most of these premature deaths could have been prevented through action on tackling the four main risk factors – unhealthy diet, physical inactivity, harmful use of alcohol and tobacco use," says Dr Ala Alwan, Regional Director of WHO's Eastern Mediterranean office. "By curbing access to and controlling, with a view to ending, the addictive use of tobacco, countries will witness a dramatic reduction in premature deaths from NCDs."

Scientific highlights

Global burden of disease due to smokeless tobacco consumption: Analysis of surveys from 101 countries: (Abstract PD-763-19)

Economic burden of tobacco-related diseases in India: Previous studies of the economic burden of tobacco-related diseases in India are out of date. This latest study projects the direct medical cost of treating tobacco-related diseases, indirect costs due to tobacco-related disease, and the indirect costs of premature deaths attributable to tobacco use.

Smoking among the poor and the impact on the economy and health in Bali: Indonesia has the third-largest number of smokers of any country, after China and India. This study provided new data on smoking patterns among people living in Bali's slums and surrounding villages, showing high household expenditures on tobacco, leading to high rates of both non-communicable and infectious diseases.

Effect of second-hand hookah smoke in hookah bar workers: Globalization is causing more youth to turn to alternative forms of tobacco, like shishah. This study presented results from an analysis of multiple measures of air pollution in the ambient air of hookah bars and the effects of such exposure on bar workers in New York City.

Tobacco use and social determinants in 30 Sub-Saharan African countries: analyses of national level population-based surveys.

The UAE Paradox: Stricter tobacco control policies, but a stronger tobacco industry: Despite having progressive tobacco control policies, the UAE has high rates of tobacco us. This study presented an analysis of the tobacco industry in the UAE, drawing from data over 15 years on tobacco manufacturers, distributors, importers, duty-free shops, and suppliers.

- The Quebec Class Action Lawsuits: A game changer for tobacco control in Canada?
- New Zealand's challenges to responding to new nicotine products
- Cigarette price differences and cross-border purchase of tobacco products across the European Union in 2012
- Promoting cross-border shopping by preserving price differentials between countries: the tobacco industry´s pricing games in Central Europe
- Conflicts of interest in tobacco control in India
- State-ownership of the tobacco industry: a "fundamental conflict of interest" or a "tremendous opportunity" for tobacco control?
- The second study on WHO MPOWER tobacco control scores in the Eastern Mediterranean Countries based on the 2013 report: improvements during two years

We see many countries are taking steps to beat back the influence of the tobacco industry.

- Did the tobacco industry know that smoking caused cystic fibrosis-like lung disease before the scientific community?
- Effect of hookah smoking on indoor air quality in homes
- Return on investment of tobacco control mass media campaigns in low- and middle-income countries
- Sick bedfellows: identifying and confronting allies of the global tobacco industry
- Smoking in pregnancy: an integrated model, incorporating well-being, healthy eating, body image and self-esteem
- Raising taxes on cigarettes in Brazil: the decline in prevalence is the most important result, with no proved evidence of increase in illicit trade.
- The impact of prices on the onset of tobacco use: an individual-data study for Argentina
- Electronic cigarettes are effective for smoking cessation: evidence from a systematic review and meta-analysis
- Impacts of plain or standardised packaging among adult smokers: insights from the ITC-Australia survey
- 'Connecting the DOTS': tuberculosis and tobacco dependence treatment integration in Maharashtra, India
- Application of the Abridged SimSmoke Model to four Eastern Mediterranean countries
- E-cigarette use and user profile among current smokers in Finland
- Free trade agreements a challenge to FCTC Implementation: a case for tobacco exclusion
- Cigarette smoking and water pipe use epidemics in Arab world: Recognizing dual users among youth
- E-cigarette use, product characteristics, and perceived satisfaction: Findings from the ITC Netherlands Tobacco and Nicotine Products Survey
- Opinions and practices regarding electronic cigarette use among Romanian adolescents MEH

WHO urges increase in vaccination and child care in ebola-affected countries

A growing risk of outbreaks of measles, pertussis, and other vaccine-preventable diseases in countries affected by ebola must be countered by urgent scaling up of routine immunization activities, the World Health Organization (WHO) has urged.

The ebola outbreak, which has infected some 24,000 people and killed around 10,000 of them, has reduced vaccination coverage in Guinea, Liberia and Sierra Leone, as health facilities and staff focus on halting the outbreak.

"Any disruption of immunization services, even for short periods, will result in an increase in the number of susceptible individuals, and will increase the likelihood of vaccine-preventable disease outbreaks," according to a WHO document sent out at the end of March. The new Guidance for Immunization Programmes to help countries maintain or restart immunization services includes infection control precautions for health workers.

The document notes that for countries not affected by ebola, routine immunization and surveillance "should continue using the normal safe injection and waste disposal practices", and mass vaccination campaigns for measles in areas that are free of ebola transmission should be implemented.

During the ebola outbreak, people infected with malaria have been unable to get treatment, either because they have been too afraid to seek help or because such facilities have been closed. To rapidly reduce the malaria burden and the number of febrile people with malaria presenting at ebola evaluation facilities, WHO recommended mass drug administration (MDA) of anti-malarial medicines to all eligible people in areas heavily affected by ebola. MDA campaigns with first-line anti-malaria drugs were carried out in Sierra Leone and Liberia from October 2014 to January 2015, reaching an estimated three million people through door-to-door distribution.

Liberia and Guinea have executed measles outbreak response vaccination activities targeting children under five in outbreak districts, and Guinea is putting together an outbreak response plan targeting 10 additional districts.

Before widespread vaccination, measles caused about 2.6 million deaths each year. The disease remains one of the leading causes of death among young children globally; some 145,700 people died from measles in 2013 – mostly children under the age of 5 – which equates to about 400 deaths daily or 16 deaths every hour. Most measles-related deaths are caused by complications associated with the disease more commonly in children under the age of 5, or adults over the age of 20.

Children under five affected most

Meanwhile, scientists are trying to find out why ebola progresses more quickly and is more likely to be fatal for children under five, and whether children are getting treatment appropriate for their age.

Findings published in the *New England Journal* of Medicine show that although the rate of infection is lower in children than adults, young children who get the disease have a lower chance of surviving it.

As of March 2015, nearly 4,000 children under 16 have been affected by ebola in the current epidemic, around a fifth of all confirmed and probable cases. Ebola has killed around 90% of children aged under a year and around 80% of children aged one to four years who are infected. Older children are much more likely to survive the disease - it has killed 52% of children infected aged 10 to 15. For adults aged 16 to 44, the case fatality rate is 65%.

The incubation period is shorter in children under a year, and children show differences in symptoms. Children were more likely to have a fever when they first see a doctor, and less likely to have pain in the abdomen, chest, joints, or muscles; difficulty breathing or swallowing; or hiccups.

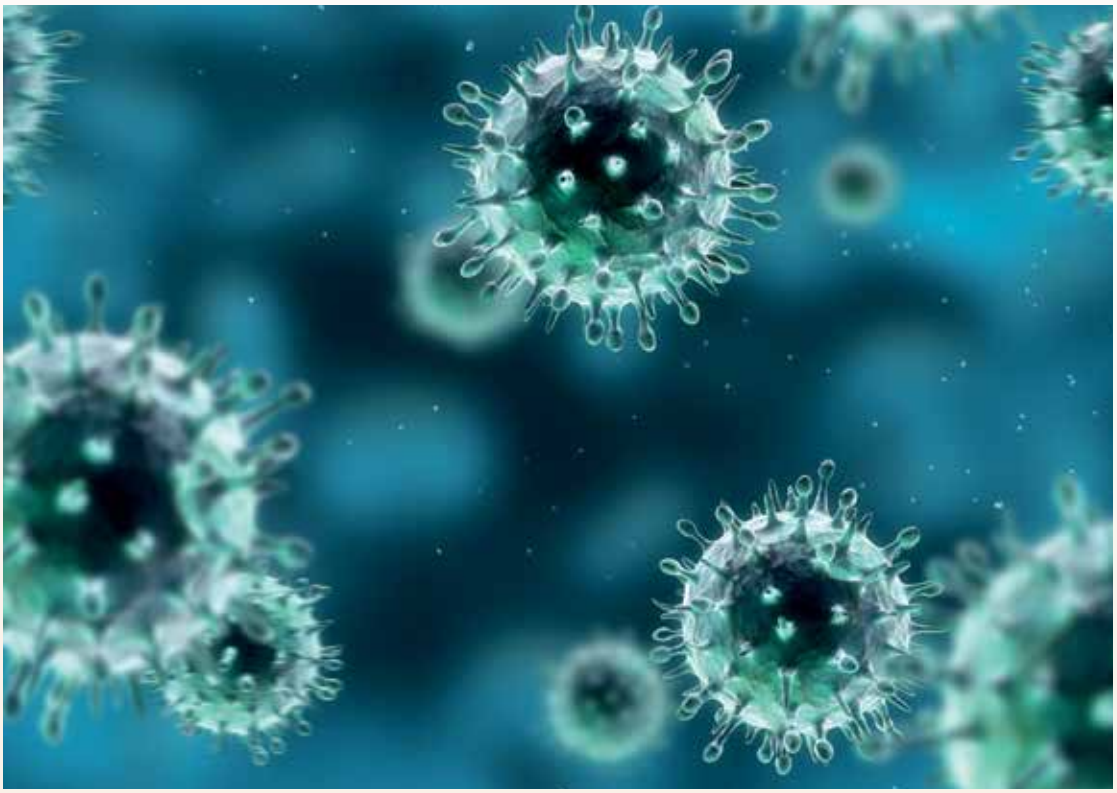
Dr Chris Dye, head of WHO's Ebola epidemiology team in Geneva and a co-author of the study, added: "The findings of this study emphasise that children suffering from ebola need the highest quality medical care, but they leave open the question of why older children, aged 10-15 years, appear to be less vulnerable to ebola than either infants or adults. This is a topic for future research."

Joint effort to reach zero cases

The WHO and World Food Programme (WFP) have agreed to combine their expertise in more than 60 priority districts and prefectures on the ground in Guinea, Liberia, and Sierra Leone.

Over 700 people are currently deployed in the ebola-affected countries. In districts with ongoing ebola transmission, WFP is ensuring that WHO disease detectives have the resources they need – computer equipment, phones and stable internet connectivity – to share information critical to tracking and stopping the virus.

WFP is also managing the fleet of rugged vehicles carrying WHO social anthropologists and epidemiologists to isolated villages, where they will continue gaining the trust of communities to find and follow contacts of ebola patients until all cases are resolved. MEH



Four-strain flu vaccine tested

A flu vaccine given just under the surface of the skin that includes four strains of inactivated influenza could be more protective than a similar flu vaccine containing only three strains, Saint Louis University research found.

These findings, which appeared in the 25 February 2015 issue of *Vaccine*, confirmed the expected results, said Geoffrey Gorse, M.D., professor of internal medicine in the division of Infectious Diseases at Saint Louis University and the study's lead author.

Findings from this study of flu vaccines delivered by a small needle intradermally parallel earlier results that found adding a strain of influenza B could improve the effectiveness of a flu vaccine nasal spray and a traditional intramuscular vaccine that is injected as a shot in the arm muscle.

All studies showed the addition of the B strain improved the antibody response to that strain and didn't weaken the body's immune response to other flu strains in the vaccine.

Flu vaccines can be trivalent – containing two strains of influenza A and one of influenza B – or quadrivalent – including two strains of A and two of B. Both are available to fight influenza.

Scientists create a flu vaccine annually based upon the strains of influenza they predict will circulate for the next season. Despite rigorous modelling practices, the virus in the vaccine occasionally doesn't match the circulating strain of influenza.

There are two lineages of B flu strains, and 50 percent of the time in the past decade, the trivalent vaccine B strain did not match the circulating B strain. The quadrivalent vaccine has both B strains in it.

"We found adding a fourth strain to the vaccine increases the chance the vaccine will match the circulating flu B strains," Gorse said. "At the same time, the addition didn't compromise the vaccine's ability to protect against the other three strains and was just as safe. Over time, the four-strain vaccine may be an important strategy to provide improved protection against influenza."

During the study, 3,355 volunteers who were between 18 and 64 years of age were vaccinated at 38 sites in the United States. They were randomized to receive one of three vaccines: the quadrivalent flu vaccine that contained two A flu strains and both lineages of the B strains; the licensed trivalent intradermal vaccine for the 2012-2013 flu season; or an alternate trivalent intradermal vaccine that contained two A strains and the B strain that was not in the licensed seasonal flu vaccine.

We found adding a fourth strain to the vaccine increases the chance the vaccine will match the circulating flu B strains.

Volunteers who received the quadrivalent vaccine had superior antibody responses to the B strains and equally robust responses to A strains compared to volunteers who received the trivalent vaccines that did not contain the corresponding B strains.

Further, adding another B strain didn't compromise the vaccine's ability to cause the body to mount an immune response to the other flu strains. The responses of those given the quadrivalent vaccine were the same as those of volunteers who received the vaccine with two strains of A and the strain of B that matched the B strain in the 2012-2013 seasonal flu trivalent vaccine.

The research was supported by Sanofi Pasteur, the maker of the intradermal vaccines. MEH

Anti-herpes drug may help control HIV

Valacyclovir, a drug commonly used to control the virus that causes genital herpes, appears to reduce the levels of HIV in patients who do not have genital herpes, according to a study by researchers from the National Institutes of Health, Case Western Reserve University, Cleveland, Emory University, Atlanta and Lima, Peru.

The study of 18 patients is the first to show that the drug does not require the presence of herpes simplex virus 2 (HSV-2) to suppress HIV in patients. The researchers hope to confirm their results in a larger study.

"These findings are very encouraging," said senior author Leonid Margolis, Ph.D., head of the Section on Intercellular Interactions at the NIH's Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD). "If valacyclovir's effectiveness against HIV can be confirmed in a larger cohort, it could be added to the mix of drugs used to suppress the virus, and might prove especially helpful in cases in which HIV has developed resistance to other drugs."

The study, published online in *Clinical Infectious Diseases*, was supported by NIH's Bench to Bedside Program, which funds research teams seeking to translate basic scientific findings into medical practice.

These results follow a 2008 study <*http://www.nichd.nih.gov/news/releases/Pages/sep091008_HIV_HSV.aspx*> by the same research team, which showed that acyclovir suppresses HIV in laboratory cultures of human tissues that were infected with various kinds of herpes viruses. Valacyclovir is referred to as a prodrug for acyclovir because it's structurally similar to acyclovir, and is converted to acyclovir in the body. For the current study, the researchers used valacyclovir because it remains in the blood longer than acyclovir and so would not need to be taken as often.

Earlier studies have shown that acyclovir reduces HIV levels in patients co-infected with HIV and HSV-2, the virus that causes genital herpes.

However, this effect has been attributed to the drug's anti-HSV-2 activity.

The decrease in immune activity results in fewer active immune cells for HIV to infect.

In contrast, the laboratory results of the research team indicated that the drug likely reduced HIV levels by interfering directly with HIV's reproductive machinery and did not require the presence of HSV-2. HSV-2 chemically alters acyclovir, by attaching chemical groups known as phosphates to it. It is this altered form of the drug that suppresses HSV-2.

The researchers believe this form also interferes with HIV's ability to reproduce. In their earlier study, the researchers found that many other kinds of herpes viruses can also attach phosphate groups to acyclovir. Dr Margolis noted that these other herpes viruses are widespread and that most people harbour at least one of them.

"We wanted to find out whether such a mechanism could operate in the cells of patients with HIV," Margolis said.

The researchers enrolled 18 HIV-infected patients in their study, none of whom were infected with HSV-2, and treated them with valacyclovir. For 12 weeks, half of the enrolled patients took valacyclovir twice a day while the other half received a placebo. After two weeks, the placebo group received valacyclovir while the group originally treated with the drug switched to the placebo.

The researchers found that when the patients took valacyclovir, their blood HIV levels declined significantly. Typically, HIV patients take a cocktail of several anti-HIV drugs because a single drug is not enough to suppress the virus. Multiple HIV medications also hinder the virus's ability to develop resistance to the drugs.

> If valacyclovir's effectiveness against HIV can be confirmed in a larger cohort, it could be added to the mix of drugs used to suppress the virus.

The researchers conducted a genetic analysis and found that the HIV in the study volunteers did not develop resistance to valacyclovir. But because HIV has a history of becoming resistant to the drugs used to treat it, the researchers do not discount the possibility that the virus could develop resistance to valacyclovir with longer treatment. Given the ability of the drug to lower HIV levels, however, the researchers believe that valacyclovir could one day be added to the cocktail of drugs given to HIV-infected people.

"Larger randomized trials and cost-effectiveness analyses could be warranted to further explore the potential of [valacyclovir] in the context of HIV-1 infection, in particular in combination with other antivirals," the study authors wrote. MEH

New cases put MERS-CoV under the spotlight

WHO says the recent death of a German citizen and a spate of new cases in the Arabian Peninsula has highlighted the need for member states to continue their surveillance for acute respiratory infections and to carefully review any unusual patterns.

Besides the case of the German citizen who tested positive for MERS-CoV on 7 March 2015, after returning from Abu Dhabi, UAE, the WHO reported seven more cases in Saudi Arabia, and one in Qatar, the country's 13th overall on 9 March. The WHO said the Qatar man, who had underlying illnesses, had had frequent contact with camels and drank raw camel milk.

The WHO revealed that four of the latest cases were in healthcare workers and four other patients may have contracted the virus in hospitals.

The new cases raised Saudi Arabia's MERS-CoV count in March to 30. The cumulative total of 950 cases in Saudi Arabia since 2012, of 1,082 cases worldwide, includes 412 deaths and 512 recoveries.

The agency said rapid response teams working to prevent transmission in healthcare facilities made 18 field visits, 15 houses to monitor contacts of case-patients were visited.

To date, there is no specific antiviral treatment recommended for MERS-CoV infection. For severe cases, current treatment includes care to support vital organ functions.

Infection prevention and control measures are critical to prevent the possible spread of MERS-CoV in healthcare facilities. It is not always possible to identify patients with MERS-CoV early because, like other respiratory infections, the early symptoms of MERS-CoV are non-specific.

Droplet precautions should be added to the standard precautions when providing care to patients; contact precautions and eye protection should be added when caring for probable or confirmed cases of MERS-CoV infection; airborne precautions should be applied when performing aerosol-generating procedures.

Until more is understood, people with diabetes, renal failure, chronic lung disease, and immunocompromised persons are considered to be at high risk of severe disease from MERS-CoV infection. These people should avoid close contact with animals, particularly camels, when visiting areas where the virus is known to be potentially circulating. Hands should be washed regularly, and drinking raw camel milk or urine, or eating meat that has not been properly cooked should be avoided.

Underlying illness

According to recent studies, the Munich patient, which marked Germany's third MERS-CoV case, had a chronic blood disease called multiple myeloma. He was from the UAE, and had recently tended one of his camels that was sick. He was hospitalized in Abu Dubai two days after becoming suddenly ill, and was then transferred to Munich with severe acute respiratory infection. He rapidly developed kidney failure and died of septic shock 10 days later.

The patient fits what appears to be a typical profile of those infected with MERS. All patients either lived in one of the Middle East countries (many had contact with camels), or had recently travelled there, or contracted MERS from a patient who had "imported" it to Europe from the Middle East. In addition, the typical MERS patient is older, predominantly male, and has some underlying disease or compromised immune system. MEH

Study of young camels

A new study of MERS-CoV in camels published in March in *Emerging Infectious Diseases*, suggests that the virus primarily infects calves and that avoiding contact with camels less than two years old may help prevent human cases.

Serologic testing showed evidence of MERS-CoV antibodies in more than 96% of camels over two years old. MERS-CoV RNA and actual virus isolates were found only in camels less than four years old, and they were significantly more common in calves (under one year old) than in "subadults" (two to four years old).

The researchers also ran a phylogenetic analysis of nine MERS-CoV isolates, which belonged to three lineages. One of these lineages seemed to be closely related to viruses circulating in eastern Saudi Arabia, and some camels in the sampled flock had been moved to Saudi Arabia for grazing.

Because the cows were not infected before their calves, "perennial persistence of MERS-CoV in adult dromedaries is unlikely."

The authors added, "The highly compartmentalized social structure of livestock camels would provide population niches in which viruses can differentiate in isolation after bottleneck-type transmission events. This holds promise for control of the spread of MERS-CoV through flock management practices, and it suggests a simple way of avoiding camel-to-human transmission by avoiding camels under two years of age."

Also, camel calves are generally separated from mothers at 12 months, and because humans normally have contact with calves only after this, postponing separation until the calves are older might reduce the risk for camel-to-human MERS-CoV transmission.

A sustainable healthcare funding model

By **Jad Bitar**, Partner and Managing Director and **Raffi Boladian**, Project Leader at The Boston Consulting Group

The crux of the problem lies here: a healthcare scheme that is exclusively and solely funded by the government is, simply put, not financially sustainable in the long run, even for rich countries.

Today, an overwhelming number of governments worldwide are facing a formidable healthcare challenge, the root of which arises directly from rapidly rising costs.

Over the past few decades, healthcare spending has – on a global level – surged at an alarming pace as a result of a number of factors, including high prevalence of non-communicable diseases (NCDs); ageing populations; rapid evolution of medical technology, and soaring life expectancies.

There is no doubt that the economic burden of healthcare is a complex matter – one that Gulf Co-operation Council (GCC) states have certainly not been immune to. In recent years, the steadfast growth of healthcare expenditures has taken a particularly heavy toll on GCC governments. Unfortunately, however, this trend shows no sign of abating – at least for the next two decades. According to a recent estimate, the region's total healthcare spending could reach US$100 billion by 2028.

In order to address the healthcare cost looming crisis adequately and comprehensively, it is important to understand the root causes first. At present, in the GCC, the vast majority of healthcare spending is funded by governments, and in most GCC countries, healthcare is the second or third largest component of the state budget, after defence and education.

The crux of the problem lies here: a healthcare scheme that is exclusively and solely funded by the government is, simply put, not financially sustainable in the long run, even for rich countries. Healthcare when offered for free, like any other service, will experience infinite demand leading to systematic increased costs.

In line with this, to ensure their healthcare systems' sustainability, GCC governments must secure new sources of funding; and this, in turn, entails a greater reliance on the population and the private sector. This funding formula is already in full motion in both Abu Dhabi and to some extent in the Kingdom of Saudi Arabia, where nationals working in the private sector are offered private health insurance paid for by employers. Qatar has also followed through in the last couple of years with the introduction of a private health insurance scheme by establishing SEHA - the National Health Insurance Company.

Following these examples, GCC states

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need to redesign their healthcare financing models in ways that align providers' behaviour with the needs of a modern and sustainable healthcare system that aims first and foremost at maintaining and improving the health of its population. One of the key levers in shaping providers' behaviour is the incentive system used, i.e. the payment model.

One of the most widely used payment models in the region is the Fee For Service model (FFS). The main disadvantage associated with the widely used FFS model is the potential to incentivize providers for activities rather than for outcomes and which can lead to over-consumption of medical services and hence increased costs. It is a model where providers may be incentivized to encourage unnecessary medical interventions and treatments.

Ideally, GCC governments should avoid following the same paths as other more developed healthcare systems and move straight towards more sustainable models where health systems are focused on outcomes rather than on ensuring capacity.

There are two essential steps that GCC governments must take to control the rise in healthcare costs successfully. Firstly, as previously mentioned, they have to diversify their healthcare funding sources.

Secondly, GCC countries must shift from a traditional FFS payment model to a more diverse payment structure, including outcomes-based payment model for certain procedures. This is a formidable task in this region as public hospitals (they are the dominant providers across the GCC countries) have been traditionally funded through global budgets. Governments typically prefer this method as it is fairly predictable, stable, and administratively simple.

The downside of this approach is that it offers little incentive for providers to be efficient or improve quality; also, providers do not have the incentive to change their service offering in response to the population needs or targeted priority areas (e.g. the MERS epidemic in KSA). Private hospitals, on the other hand, generally obtain their funding via FFS payments. That is precisely why it is so imperative that GCC governments adopt a more sophisticated payment structure that mixes and matches the models with objectives they want to achieve and especially introducing the outcomes-based payment model.

Ahead of the curve

Interestingly, the Qatari government is well ahead of the curve when it comes to setting up a multi-source healthcare funding structure. As part of its National Health Strategy 2011-2016 (NHS), devised in conjunction with the objectives of the Qatar National Vision 2030, Qatar has infused a set of reforms into its healthcare sector. These improvements were especially initiated to enhance the overall system and, ultimately, contribute to the development of a healthy population. The NHS comprises a total of 35 health programs, one of which aims to help the nation to transform its universal-access healthcare program into an employer-based health insurance program tailored to meet the needs of both nationals and expatriates.

Qatar has long understood the importance of involving the private sector so it can play a powerful role in its healthcare system including provision and financing. In accordance with this vision, Qatar created a national health fund designed to aggregate sources of funding from the private sector, diversify the sources of risk and establish the foundations of a sustainable healthcare funding model.

This, of course, marks a major milestone in Qatar's journey towards a more sustainable healthcare model. Still, the existing system could benefit from a few additional tweaks: for example, even today, the Qatari government uses only a FFS payment model which is driving costs up at an alarming speed. With the further deployment of the health insurance scheme put on temporary hold, it is a great opportunity for Qatar to take stock of its short yet valuable experience in health insurance and identify what has worked and what has not.

We believe that to reap the full rewards of its reform efforts, Qatar will absolutely have to make the transition from a generic FFS model to a more sophisticated payment model and leapfrog over other developed countries by adopting an outcomes-based payment model for certain procedures.

Value-based Healthcare (VBHC) is a model of care that aims for the best outcomes for patients based on evidence and facts at the best cost structure.

> Value-based health care stands out from the rest by placing patients' well-being at the core of the equation. Providers and payers must identify, codify, and promote treatment protocols that are proven to yield better, more cost-effective care.

The goal of VBHC is not to minimize costs but to maximize 'value', defined as patient outcomes divided by costs. To implement VBHC, providers and payers must identify, codify, and promote treatment protocols that are proven to yield better, more cost-effective care. It stands out from the rest by placing patients' well-being at the core of the equation.

Needless to say, healthcare reform is a multi-faceted, multi-phased process that requires colossal changes across a slew of fronts. For example, besides the structural changes to the system, Qatar will need to continue encouraging its population to be responsible for its own health and continue to promote lifestyle changes intended to optimize citizens' overall health and deliver long-term results.

As the cost of healthcare continues to spiral out of control, governments across the GCC will have to follow in Qatar's footsteps and institute a more sustainable system. Moving forward, they will also have to look into providing citizens with the 'right type of care at the right location'. This means building more robust home healthcare platforms and dedicated long-term care facilities, which are proven to offer better quality and value. MEH

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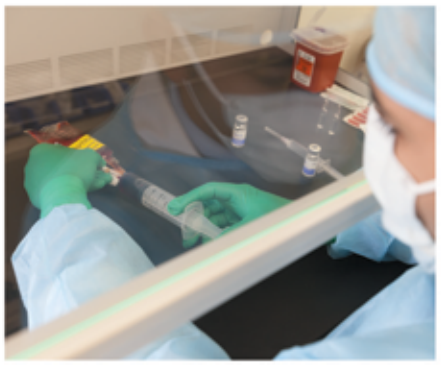


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COLLEGE OF THE NORTH ATLANTIC QATAR

HMC leads the country 's healthcare development

For nearly 40 years, Hamad Medical Corporation (HMC) has been at the forefront of healthcare in the nation. Established in 1979, HMC continues to be the largest provider of secondary and tertiary services in Qatar and one of the leading healthcare systems in the Middle East.

As Qatar has grown and developed over the past half a century, so too has HMC. The organization manages eight hospitals, incorporating five specialist hospitals and three community hospitals, the National Ambulance Service, as well as home and residential care, all accredited by Joint Commission International.

HMC is driving the development of the region's first academic health system and is committed to building a legacy of healthcare expertise in Qatar. Linking health, education and research, HMC collaborates with partners who are experts in Qatar and beyond, including Weill Cornell Medical College-Qatar, Sidra Medical and Research Center, the Institute for Healthcare Improvement and Partners Healthcare, Boston.

HMC is the first hospital system in the Middle East to achieve institutional accreditation from the Accreditation Council of Graduate Medical Education – International (ACGME-I), which demonstrates excellence in the way medical graduates are trained through residency, internship and fellowship.

To meet the changing needs of a rapidly growing population, Qatar is making significant investments in the country's healthcare infrastructure and HMC is at the forefront of this vital work.

Facilities Master Plan

Hamad Medical Corporation is delivering on one of the most ambitious hospital building programs currently underway anywhere in the world. Through the implementation of the Facilities Master Plan, HMC sets out measures to uphold the highest quality of care that will see hospital beds doubled and related parking spaces tripled by 2030.

Furthermore, the plan will have a significant impact on the delivery of healthcare services in Qatar, more than doubling the number of specialist clinics available across the Hamad system and doubling operating theater capacity. Moreover, considerable attention will be on the development of tertiary services through the construction of new hospitals and specialist clinics; these include the Women's Wellness and Research Center, Ambulatory Care Center and Qatar Rehabilitation Institute in Hamad bin Khalifa Medical City (HBKMC).

New Tertiary Hospital

Focusing on both preventative and curative care, HMC is guided by the principle that a healthy population, served by a world-class healthcare system is essential to the country's development. Therefore, an integral part of their expansion features the development of a new communicable disease hospital, currently under construction, and will be the first of its kind in the region.

Building on recent new facility openings including the Enaya Specialized Care Center, the Supportive and Palliative Care Unit at National Center for Cancer Care and Research and the Heart Hospital, the plan also comprises a significant expansion of HMC's services outside of Doha, bringing a network of new ambulatory care centers across Qatar. Hubs for secondary care will also be created at Al Khor, Al Wakra, and Cuban Hospitals using the model of one program of care across multiple sites, essentially providing the care and services patients need closer to them.

Patient Suite

Designed to support the Qatar National Vision 2030, when complete, HBKMC will be a patient-centered healing environment and one of the largest healthcare complexes in the region. The Facilities Master Plan will ensure HMC continues to set the standard of excellence for many generations to come. The new and enhanced facilities and network of services will support and reinforce HMC's mission to provide the safest, most effective and most compassionate care to each and every one of its patients. MEH

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College of the North Atlantic – Qatar

Changing the face of healthcare education Qatar

College of the North Atlantic – Qatar (CNA-Q) uses inter-professional education and industry partnerships to bring real-world experience to students in the School of Health Sciences (SHS). Students in the eight programs: Advanced Care Paramedicine, Dental Assistant, Dental Hygiene, Environmental Health and Safety, Medical Radiography, Pharmacy Technician, Patient Education and Respiratory Therapy, have the opportunity to work in multi-disciplined teams throughout their program to learn how to work with other professionals in a job setting.

The best example of inter-professional training is the annual CNA-Q Skills Competition. Students from SHS compete in teams comprised of one member from each discipline to tackle real-world health-related situations. The competition provides students an opportunity for hands-on experience that will help them fine-tune their skills individually and as a life-saving unit.

The event illustrates the value of technical education, and how it translates to tangible, employable, real world skills for CNA-Q students and graduates. From an educational standpoint, this makes CNA-Q graduates some of the most qualified healthcare professionals in the country.

SHS also works closely with local partners to ensure the education students receive is reflective of local industry. Most recently, the Dental Assistant and Dental Hygiene programs partnered with the Supreme Council of Health, the Primary Health Care Corporation and Hamad Medical Corporation to recognize GCC Oral Health Week. Students hosted table clinics on campus highlighting the importance of oral health to overall health.

In another major initiative SHS has partnered with Action on Diabetes, a coalition of health care providers and partners, to offer the Fundamentals of Diabetic Education program, an accredited program aimed at providing current health care employees with a solid foundation in diabetes care and management.

With innovative training, important partnerships and programs accredited internationally by the Canadian Council for Accreditation of Pharmacy Programs, the Council on Accreditation for Respiratory Therapy Education and the National Examination Board in Occupational Health and Safety, College of the North Atlantic – Qatar is ensuring a solid future for Qatar's healthcare sector. MEH

Aamal Medical

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Sherif Saleh Mohamed Shehata,
General Manager, Aamal Medical

It is one of the leading medical equipment suppliers in Qatar, specializing in the sale of medical equipment, medical and surgical consumables, hospital furniture, spare parts and consumables as well as health care and IT solutions to healthcare facilities, and also provides full-service maintenance contracts to customers. Aamal Medical also offers complete integrated solutions such as hospital information systems, enterprise resource planning solutions for health care, integrated operating theatres and total integrity pharmacy robotic systems.

Aamal Medical works with over 50 medical equipment suppliers from all over the world, and is the exclusive agent for major international well known suppliers.

Aamal Medical caters to a wide base of customers in the medical sector including government, semi-government and private sectors and with the development of the healthcare sector. It is expected that market share will increase as more projects are acquired.

Aamal Medical is committed to supply the Qatari Market with the need of high quality medical devices and consumables through dedicated and skilled sales & technical team.

Aamal Medical is one of the main players in the IT healthcare market and has been awarded several times for its distinguished performance by HMC and other authorities. We have delivered in Qatar the first Health Information System (HIS), Total Solution for the Pharmacy Automation and PACS (Picture Archiving and Communication System), in addition to Complete Integrated Operating Room Solutions (OR1). Aamal Medical is specialized in total package solution projects and particularly in the total solution for the operation theatres and total solution for pharmacy automation.

Being a leading organization in the healthcare domain in Qatar, we aim to continue providing a superior customer experience; by offering differentiated product technologies & innovative turnkey solutions while delivering quality products and services with a high level of integrity and competence to our end-users. MEH

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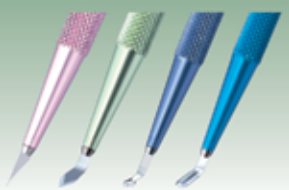

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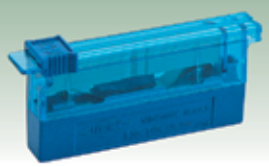

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*People who **eat breakfast cereals** tend to be slimmer than those who skip breakfast.*

A recent systematic review shows that people who eat breakfast cereal tend to be slimmer than those who do not eat breakfast[1]. In addition to this lower BMI (Body Mass Index), the evidence suggests that body shape can be positively affected by being a breakfast cereal eater. Adults who eat breakfast cereals have lower central obesity as measured by lower hip waist ratios. Similar results have been found for children. While the mechanism is not fully understood there are various theories. One possible mechanism through which breakfast cereal consumption could lead to healthier weights is reduced energy intakes. It could be that breakfast cereal eaters tend to have healthier habits, or that lower energy intakes are provided by breakfast cereals than other foods eaten at breakfast. It might also be that breakfast cereal consumption is associated with less snacking later in the day and therefore lower daily energy intakes. Another possibility may be that the beneficial effects of breakfast cereal consumption are mediated via its physiological effect on circadian rhythms, appetite control and metabolic rate.

Recent studies also suggest that regular breakfast eaters are less likely to develop heart disease and diabetes. Men who usually skip breakfast have been found to be one quarter (27%) more likely to develop Coronary Heart Disease, 15% more likely to experience substantial weight gain and 21% more likely to develop Type 2 diabetes compared to men who regularly eat breakfast[2]. This may be due to altered metabolic effects such as increased lipids and impaired insulin sensitivity. Similar results have also been reported for women[3] and young adults[4].

Obesity has reached epidemic levels in the Arab Middle East, particularly in Bahrain, Kuwait, United Arab Emirates, and Saudi Arabia, where the prevalence of overweight/obesity is reported to be over 70%, particularly among women. In the Eastern Mediterranean Region it is estimated that up to a fifth of young children and as many as 45% of school age children are overweight and obese[5]. Cardiovascular disease is the main cause of premature death in this region responsible for up to 54% of total deaths from non communicable diseases[6].

Skipping breakfast is common among both children and adults in this region. For example in the United Arab Emirates, 28% of boys aged 6-7 years skip breakfast compared to 37% of girls at same age. In Bahrain, about 42% and 59% of school boys and girls aged 10–15 years are breakfast skippers. In comparison as many as 74% of school girls aged 12–16 years skip breakfast in Saudi Arabia[7].

Kerkadi (2003) looked at breakfast habits and obesity amongst university students in the United Arab Emirates and found that 72% of non-obese female university students were regular breakfast eaters, while the breakfast skippers were more likely to overweight or obese[8]. Among adults, it has been reported that 69% of Saudi women who skipped breakfast were obese compared to the 31% breakfast eaters who were non-obese[9].

In summary there is consistent evidence that children and adults who regularly eat breakfast cereals are less likely to be overweight than breakfast skippers. Given the increasing levels of obesity and overweight in the Arab Middle East, encouraging the population to regularly consume a cereal breakfast could hold wider benefits than it first appears.

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*Dubai Health Authority. http://www.dha.gov.ae/En/healtheducation/articles/pages/vitamind.aspx

High frequency of blood tests in cardiac surgery patients may lead to anaemia

Laboratory testing among patients undergoing cardiac surgery can lead to excessive bloodletting, which can increase the risk of developing hospital-acquired anaemia and the need for blood transfusion, according to an article in the March 2015 issue of *The Annals of Thoracic Surgery*.

"Prior research shows that patients who receive blood transfusions during heart surgery have more infections after surgery, spend more time on the ventilator, and die more frequently-even after adjusting for how sick they were prior to surgery," said Colleen G. Koch, MD, MS, MBA, from the Cleveland Clinic in Ohio, who led the current study.

Dr Koch and colleagues examined every laboratory test from 1,894 patients who underwent cardiac surgery from January to June 2012 at the Cleveland Clinic. The number and type of blood tests performed were recorded from the time patients met their surgeons until hospital discharge. The researchers then tallied up the total amount of blood taken from each patient.

Results showed a total of 221,498 laboratory tests were performed during the study period, which equaled 116 tests per patient. Cumulative median phlebotomy volume for the entire hospital stay was 454 mL per patient. Phlebotomy volume differed between the intensive care unit (ICU) and other hospital floors, with ICU patients having more blood drawn, on average (332 mL vs. 118 mL).

"We were astonished by the amount of blood taken from our patients for laboratory testing. Total phlebotomy volumes approached 1 to 2 units of red blood cells, which is roughly equivalent to 1 to 2 cans of soda," said Dr Koch.

More complex procedures were associated with higher overall phlebotomy volume. Patients undergoing combined coronary artery bypass grafting surgery and valve procedures had the highest median cumulative phlebotomy volume.

The findings also noted that as the cumulative phlebotomy volume increased, so did the need for blood products. Similarly, the longer a patient was hospitalized, the more blood was taken, which increased the subsequent need for a red blood cell transfusion.

"Patients should feel empowered to ask their doctors whether a specific test is necessary-'What is the indication for the test?,' ' Will it change my care?,' and 'If so, do you need to do it every day?,'" said Dr Koch. "They should enquire whether smaller volume test tubes could be used for the tests that are deemed necessary. Every attempt should be made to conserve the patient's own blood-every drop of blood counts."

Importance of reducing bloodless

In an invited commentary in the same issue of *The Annals*, Milo Engoren, MD, from the University of Michigan in Ann Arbor, emphasized the importance of reducing blood loss to decrease possible complications during surgery. "We make efforts to minimize intra-operative blood loss, now we need to make similar efforts post-operatively," he said. "While some may argue that transfusion itself is not harmful, but only a marker of a sicker patient, most would agree that avoiding anaemia and transfusion is the best course for patients." MEH

Heart valve repair improves emotional wellbeing in patients with mitral regurgitation

Patients with severe mitral regurgitation (MR) often suffer from psycho-emotional symptoms, such as depression and anxiety, but after undergoing mitral valve repair surgery patients experience a marked improvement in emotional and physical wellbeing, according to an article in the March 2015 issue of *The Annals of Thoracic Surgery*.

Previous research has shown that one in four patients with severe MR (caused when the heart's mitral valve doesn't close tightly, allowing blood to flow backward into the heart) suffer from poor psycho-emotional status (PES), elevated anxiety, and traumatic stress levels. Other challenging symptoms, such as dyspnea (shortness of breath or breathlessness) and fatigue also have been found in patients with poor PES.

Maurice Enriquez-Sarano, MD, from the Mayo Clinic in Rochester, Minn., and Tali Bayer-Topilsky, PhD, from JDC-Myers-Brookdale Institution in Jerusalem, Israel, led a questionnaire-based analysis to assess PES and health-related quality of life in 131 patients before and six months after surgery for MR.. Results were compared to 62 patients with MR who did not undergo surgery and to 36 control patients.

In this study, PES was defined by the levels of a patient's emotional distress (depression and anxiety) and by traumatic-stress-related symptoms.

Pre-operative questionnaire results showed that PES was poorer among patients who ultimately underwent valve repair surgery, compared with the other two groups. Health-related quality of life showed similar baseline results.

"Interestingly, at the six-month follow-up examination, psycho-emotional symptoms and quality-of-life measurements in patients who underwent mitral valve correction improved and normalized to

Key findings

* Patients with severe mitral regurgitation, who had suffered from anxiety and post-traumatic stress symptoms prior to mitral valve surgery, experienced a marked improvement in emotional and physical wellbeing by six months after surgery.
* No improvement was shown in patients with mitral regurgitation and psycho-emotional issues who did not undergo surgery.
* The type of mitral valve surgery (standard vs minimally invasive) did not make a difference in psycho-emotional improvement.

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levels observed in controls; however, there was no improvement of these symptoms in MR patients who were not referred to surgery," said Dr Bayer-Topilsky. "Another important finding of our study relates to 'asymptomatic' MR patients, who did not experience any physical symptoms- like shortness of breath or fatigue-prior to the surgery, yet suffered from elevated psycho-emotional symptoms. Asymptomatic patients indeed improved after the surgical correction, thus exhibiting a better and normalized psycho-emotional status."

Additional results showed that the type of MR repair surgery (standard vs minimally invasive) did not make a difference in patient PES improvement.

"Early surgery in patients without symptoms or left ventricular dysfunction has been previously considered as providing no direct patient benefit, but our study results show how wrong this concept is," said Dr Enriquez-Sarano. "Patients with a serious valve disease often suffer from the psychological consequences of leaving that disease untreated. Eliminating the valve disease reduces this suffering, further supporting the concept of early MR repair."

Surgical repair in asymptomatic patients

In an invited commentary in the same issue of The Annals, Daniel J. Ullyot, MD, from the University of California in San Francisco, noted the inherent conflict of early surgical intervention among asymptomatic patients, "The admonition 'do no harm' councils restraint, especially in asymptomatic patients for whom the clinical benefit may be far in the future."

However, he said that the survey findings are important and require more investigation, "We need to know if improved mental health is sustained beyond six months after surgery, and if the favorable impact of surgery is the result of restoring normal valve function or some other effect of surgical intervention." MEH

Following urological guidelines reduces antibiotic resistance

A new study shows how changing working methods in surgery can significantly reduce bacterial resistance to antibiotics, while maintaining protection against infection and reducing costs by up to 60%. This work was presented at the European Association of Urology conference in Madrid in March.

Antibiotic resistance is one of the most important medical problems facing the 21st century, with the medical world acknowledging a lack of new antibiotics in development. In the absence of new drugs in the worldwide pharmacopeia and in the pharmaceutical pipelines, the only way to contain the development of resistance is by changing the way we use antibiotics. However, too often it is easier just to carry on using antibiotics as before. Now a new multi-centre study shows that adherence to guidelines can significantly reduce bacterial resistance in urology surgery.

Antibiotic use is common in urological surgery. In 2010 the European Association of Urology introduced new guidelines on urological infection in the hope of containing some of the problems associated with antibiotic resistance. In early 2011 an international group of clinicians from Italy, Germany, Norway, and the UK began to work strictly to these new guidelines, with a view to testing just how effective the procedures might be.

Over a period of 33 months they measured outcomes of 3,529 urological procedures (including open, laparoscopic, endoscopic and robotic surgery) which took place under strict adherence to the *EAU Guidelines*. The results were compared with 2,619 similar procedures from 2006-8 carried out before the new guidelines were implemented. They found that the rate of infections was similar in the two periods. However, the costs of the antibiotic drugs, and other indirect costs, were significantly lower in the period the guidelines were followed. The antibiotic resistance rates also dropped significantly.

Lead researcher Dr Tommaso Cai, from Santa Chiara Hospital, Trento, Italy, commented: "The changes we made were fairly significant, and required monthly audits to ensure that we were sticking to the new system. For example, under the old system, it was standard practice to give a patient who was having an operation for benign prostatic hyperplasia, the antibiotic ciprofloxacin both before surgery, and then for 7 days afterwards. But when we adhered to the guidelines we only gave the antibiotic prior to the surgery".

"We were pleased to find that infection rates did not change between the 'before' and 'after' periods. However, we also saw significant costs savings, and perhaps most importantly we were able to show a significant decrease in bacterial resistance. For example, E.Coli resistance to ciprofloxacin decreased by around 15% after we adopted rigorous adherence to the guidelines".

The reduction in drug-related costs was highly significant: cost-per-procedure was €46.90 in the 'before guideline' period, but these dropped to €18.77 when working to the guidelines, a drop of 60%.

Professor Robert Pickard (Professor of Urology, Newcastle University, UK), Chair of the EAU Guideline Panel on Urological Infections (and a co-author of the study) said: "The main bacterium that causes all types of urinary infection, *Escherichia coli* (E.coli), is becoming increasingly resistant to treatment using the antibiotics we have available in 2015. This antibiotic resistance is a major health threat, particularly to countries in the EAU community with our advanced healthcare systems. The only proven way to reduce the threat is by antibiotic stewardship to control the overuse and misuse of antibiotics in healthcare. This study shows that by following a few simple rules hospital usage of antibiotics can be dramatically reduced without affecting patient safety, and results in lower resistance and reduced costs." MEH

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US hospitals forge close ties with Middle East

By **Renée-Marie Stephano**, JD

New prosthetic limbs are definitely on the cards for a pair of Gaza twins born with dysfunctional limbs, but that's for the not-too-distant future when they grow older. Just taking their first steps a few years ago, was a miracle in itself.

Itaf Shallouf's daughters, Lamise and Rimas, suffered from a type of congenital deficiency that left them without the tibia bones in their lower legs, and it was feared they would never stand. But today the Shallouf girls are walking, albeit gingerly, thanks to a medical tourism experience that took them from the Middle East to the United States for a series of surgeries and prosthetic fittings at Shriner's Hospital for Children in Los Angeles.

Ever since Sheikh Zayed bin Sultan Al Nahyan, President of the United Arab Emirates, Ruler of Abu Dhabi, visited the Cleveland Clinic for a liver transplant more than decade ago, healthcare providers in Los Angeles and other large cities in the United States have opened their doors to medical tourism patients who seek a range of both simple and complex procedures.

Since then, hospitals have recognized that medical tourism patients from the Middle East, who seek a range of treatments from cosmetic surgery to cancer care, spend both more time and money than many other foreign patients

Most patients who come for expensive procedures pay the full price for their care. Boston's Children's Hospital saw profits jump last year by 28%, thanks, in part, to a surge in medical tourism patients from the Middle East. Not surprisingly, marketing efforts have been extended to reach this lucrative clientele from the oil-rich Kuwait, Saudi Arabia, the United Arab Emirates and Qatar at a time when revenue growth from the US patients has stagnated.

Arabic services

Patients from more than 100 countries visit Detroit Medical Center. They welcome potential patients from the Middle East with an Arabic website. Personalized services for these patients include arrangements for dietary and cultural requirements, such as halal meals and proper dress for women during exams; interpretation and resource material in Arabic; and information detailing both on-campus and off-site areas for prayer and religious services.

At John's Hopkins in Maryland, Arabic patients are often placed in the hospital's luxury wing, which boasts such luxuries personal chefs and fashionable robes in place of the plain medical gowns.

The UAE, which in some cases pays for the medical bills and air fare for their citizens requiring treatment overseas has been the largest market for foreign medical visitors to John's Hopkins.

Surf, sun and sand

The US-based Medical Tourism Association is working with the Kingdom of Bahrain and a Saudi Arabian consulting firm to bring wealthy Arab patients to Florida, for treatment at facilities like Florida Hospital, Moffitt Cancer Center and Miami Children's Hospital, amongst others.

Meanwhile, in Florida, the state is developing strategies to stop the flow of American patients to destinations overseas. This year, the Sunshine State allocated some $5 million from its $51 billion tourism budget to promote Florida as a destination for patients and medical meetings.

Other states have joined the competition by passing legislation, revitalizing their cit-

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ies and spending millions to reverse the trend of Americans leaving the United States and taking with them an estimated $15 billion in revenue for what are primarily affordable elective treatments abroad. In Minnesota, the state legislature approved $585 million in funding to upgrade infrastructure in Rochester and enhance the appeal of the Mayo Clinic. The international Center of Excellence has already put $5 million towards expansion of the latter to solidify its footing as a "global medical destination centre".

Partnerships

While competition for international patients can be fierce, not all of the battles are being waged on US soil. Some US hospitals see the opportunity to reinforce existing relationships or establish new partnerships that are enabling patients to stay in the Middle East and receive world-class care to treat digestive disease, eye, heart, vascular and neurological disorders, and respiratory conditions, amongst others.

In a move, leading US hospital Cleveland Clinic opened a state-of-the-art hospital in Abu Dhabi. The 750-bed facility is the sole responsibility of Cleveland Clinic, the first major academic medical centre in the United States to manage both the hospital and delivery of care in the Middle East.

The opening comes on the heels of an agreement between Dubai Healthcare City and Houston Methodist Global Health Care Services, which will provide education and training initiatives at the Mohammed Bin Rashid Academic Medical Center. The Methodist Hospital in Houston has ongoing agreements that provide for a continuum care in Saudi Arabia.

Meanwhile, Johns Hopkins is in talks with the Kuwait Ministry of Health to provide consulting services for hospital management, medical education, patient safety, nursing, preventative medicine and healthcare policy. In yet another venture, the international healthcare giant is providing similar services for Saudi Aramco, a global petroleum company owned by the Saudi government.

Strength in numbers

Global collaborations like these, while creating a magnet to forge new revenue streams and strengthen brand recognition, at its essence helps save lives and improves the care of patients.

For example, the health of paediatric cancer patients, has significantly improved since the Dana Farber/Children's Hospital Cancer Center in Boston partnered with the Egypt Cancer Center and Children's Cancer Hospital Egypt (CCHE) to create Middle East-based training programs for local oncologists. In fact, although survival rates for childhood cancers are well behind the numbers found in Western countries, cure rates at CCHE are now on a par with those in the US. However, at the same time, the demand for quality services has increased so much that five out of seven children hoping to be admitted to CCHE are turned away.

Understandably, there is still a shortage of expertise and resources. However, one Egyptian-American girl living in the United States was determined to do something about it. After learning of the plight of the copious children with cancer in the Middle East, eight-year-old Lobna asked that, in solidarity with these patients, gifts for her birthday be donated to CCHE for sorely needed beds. MEH

About the Author

Renée-Marie Stephano is president of the Medical Tourism Association, a non-profit traded organisation she co-founded to advance healthcare options – both quality and affordable – to meet the needs of consumers and providers and to help transition and sustain economic development in regional, national and international communities. To this end, she engages government officials including ministers of health, tourism and economic development to pursue public-private partnerships in support of both international and local healthcare goals.

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Travelling to Boston offers a second chance for a baby with a life-threatening brain cyst

Other than being born a little early – at 37 weeks – everything started out fine for Liam Hammond of Washington, DC. "He was a healthy baby, it was a healthy birth, and he was progressing and meeting his milestones," says his mother, Jennifer.

But at his four-month check-up, "something about his head looked different to me."

Liam's head circumference was normal, though, and he was in the same head-growth percentile as at his last visit. The paediatrician suggested Jennifer keep watching it.

Two weeks later, the family left for a seaside weekend vacation. "I was pretty sure his head was swelling," Jennifer says. "No-one else could really see it, but the distance from the top of his eyebrow to the top of his head looked wider. By Sunday evening, he was very fussy, and it seemed like the vein down the centre of his forehead was more prominent."

Jennifer and her husband decided to cut their weekend short, leaving Monday morning rather than evening. Jennifer noticed that the fontanelle at the top of Liam's head – where the bones of his skull had not yet fused together – was no longer soft.

Hours later they arrived at their local hospital, which took a CT scan. "The emergency room doctor came in and looked as white as a ghost," Jennifer recalls. "She said, 'Your baby has a mass in his head.' She had already arranged a transfer."

"He could have a 50-50 shot"

In the wee hours of Tuesday morning, a neurosurgeon at the second hospital told the Hammonds that Liam had a large cyst adjacent to his brain stem. "He said, 'I've only seen it three times in this location, and I've never operated on it in this location. He could have a 50-50 shot,'" Jennifer recounts. "I looked at my husband and said, 'As a mom, I can't accept this, I'm sorry.'"

She searched the internet from Liam's room in the paediatric intensive care unit to try to find out where in the world was the best place to bring her son. Her search led to Boston Children's Hospital's neurosurgeon-in-chief Alan Cohen, MD. He returned her call within two hours. Once he heard Liam's story, Cohen encouraged the family to stay put. He believed Liam had dangerously elevated pressure inside his head. "I'd be happy to consult on his case," he told the Hammonds. But they were insistent, so he said, "Let's start with the MRI." Jennifer and her husband, Andrew, uploaded Liam's scan to a secure website.

Cohen's concern about a transfer increased. The cyst was pressing on Liam's brain stem, causing hydrocephalus – a back-up of fluid in his brain – and raising the pressure inside his head to dangerous levels. This was also evidenced by Liam's extreme irritability and his gaze, which was cast downward.

"Liam was a very sick child," Cohen says. "That much pressure in his head is a life-threatening, ominous sign. His anterior fontanelle, which is usually nice and soft, was rock hard, tense, bulging up, like a pressure cooker. I didn't think it would be safe to transfer him."

The Hammonds were willing to take the risk and travel from Washington DC to Boston. "I know it sounds clichéed," says Jennifer, "but I knew in my gut that if he stayed there, it was not going to be a good outcome."

Cohen finally agreed, and Liam was Medflighted to Boston Children's, accompanied by Jennifer.

Relieving the pressure

"About 15 to 20 minutes after we got there, Dr Cohen walked in, put his hand on my arm and said, 'Welcome to Boston. I'm going to do my best to help him.' He showed concern for Liam as a little boy, not just a patient with a medical condition. He had genuine compassion."

Liam was quickly brought to the operating room. To relieve the pressure on his brain, Cohen and his team made a small incision in the back of Liam's scalp and placed a temporary drain in one of the brain's fluid-filled spaces, or ventricles, to drain off the fluid. They then set about removing the cyst, which was trapping the fluid at the base of Liam's brain like a stopper in a sink.

"It was more serious than we had anticipated," he told the family afterwards. "When we opened Liam's skull, the cyst started 'delivering' itself like a baby: it started pushing out of his head."

Liam improved almost immediately: his irritability went away, and he was alert. His post-operative MRI scan showed that the pressure inside his head had dropped dramatically.

But five days later, he began crying and vomiting. A repeat scan showed that he still had hydrocephalus. "Even though we removed the cyst, some kids develop hydrocephalus from a blockage farther downstream in the system," Cohen explains.

On June 9, Cohen and his team operated again. This time, they placed a permanent shunt in Liam's brain to drain the excess fluid.

"It wasn't the plan, but we knew Dr Cohen had Liam's best interest at heart," says Jennifer. "Liam was never treated as a number, but as a little boy they had taken under their wing. They were going to make sure that he would have the best possible outcome."

A different story

The next day Liam's smile returned. A week later, he was alert, eating well and ready to go home, and he's remained happy and healthy ever since.

"He's developing nicely and is completely normal," says Cohen. "This was a life-threatening illness, but Liam will have a normal life."

On 5 January, Liam celebrated his first birthday.

"I've been reflecting on how different our lives could have been had we not travelled to Boston Children's," says Jennifer. "Dr Cohen took the time to give a little boy a second chance. Under normal circumstances, we would have been expected to accept the local expert. We learned that when it comes to critical health care, you have to advocate intensely for your child."

Boston Children's Hospital is a worldwide destination for the treatment of rare and complex medical conditions in children. Each year, we admit more than 25 000 patients – including over 2,000 international patients -- and perform more than 26 000 surgical procedures and 150 000 radiological examinations. As the home of the world's largest paediatric research enterprise, we offer unrivalled access to innovative treatments and technology. Learn more about how Boston Children's International Center cares for patients at *bostonchildrens.org*/international. MEH

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Christine Gabriel, happy to be back doing what she loves best.

Back in the saddle

After being treated for ovarian cancer, Christine Gabriel – who also survived breast cancer – returned to work doing commentary for horse racing clubs in the US and across the world.

When asked about her chances of beating ovarian cancer, horse racing handicapper and on-air analyst, Christine Gabriel, 57, says the odds were against her.

Between 1987 and 2000, Gabriel underwent treatment for breast cancer three times. Then in 2008, when she thought she had pneumonia, one physician told her the breast cancer had recurred, she had six months to live and she should "get her affairs in order".

"That was unacceptable," said Gabriel, who at the time lived both at her home in Inverness, Illinois, and in Dubai, where she and her husband, Frank, both worked for the Meydan Racecourse.

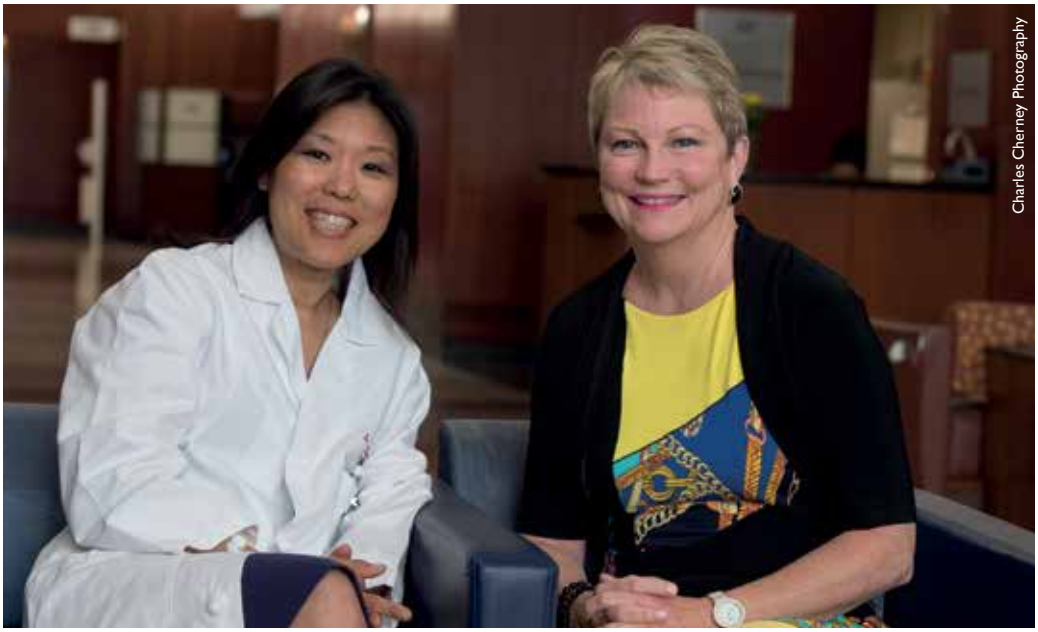
The stakes were high

Gabriel was familiar with the University of Chicago Medicine Comprehensive Cancer Center through Riding for a Cure, a charity organization she founded eight years earlier when she was a TV analyst for Arlington International Racecourse in Arlington Heights, Illinois. Some of the funds raised through the group's equestrian events had supported research at the cancer center.

"We learned from them that even $40,000 could get a project off the ground," Gabriel said. "And the cancer center really appreciated what we were doing." Gabriel transferred her care to the University of Chicago Medicine and to S. Diane Yamada, MD, one of the physicians whose research the group had funded.

Imaging exams showed that Gabriel had fluid in her lungs, which can be a complication of cancer. Blood tests revealed highly elevated CA125, a marker indicating cancer activity in the abdominal cavity. Results of a computed tomography (CT) scan pointed to primary peritoneal carcinoma, a type of ovarian cancer.

"As with the majority of patients with ovarian cancer, the disease was at an advanced stage when it was discovered," said Yamada, who leads the gynecologic oncology program at the University of Chicago Medicine. "We needed to take an aggressive



S. Diane Yamada, MD who leads the gynecologic oncology program at the University of Chicago Medicine, with Christine Gabriel following the successful cancer treatment.

approach to her surgical and medical care."

Yamada performed extensive debulking surgery – a hysterectomy as well as removal of the omentum and a portion of the bowel, and stripping of the diaphragm. The goal of the surgery was to remove all visible evidence of tumor. The debulking procedure has proven to increase survival rates for ovarian cancer patients.

Yamada then recommended a combination of intravenous (IV) and intraperitoneal (IP) chemotherapy for the next phase of Gabriel's care. IP chemotherapy, given through a catheter inserted directly into the peritoneal cavity, bathes the entire abdominal area with a high concentration of chemotherapy for an extended period of time. National Cancer Institute-supported clinical trials leading to the recommended use of this treatment had been completed just two years before Gabriel was diagnosed. Yamada and her colleagues at the University of Chicago Medicine participated in the groundbreaking trials.

While IP chemotherapy results in longer relapse-free survival for patients, women can experience difficult side effects while undergoing the treatment, including low blood counts, metabolic complications and neurological problems.

"Christine was otherwise healthy, so I felt she could physically handle the IP chemotherapy," Yamada said. "She was also really tough."

As a young girl learning to ride, Gabriel's father had told her to "brush off and get back on the horse" every time she was bucked off. She took that same approach when experiencing setbacks during the cancer treatment. After each challenge, she said, "I always got back in the saddle."

But she never wanted false hope. "I asked Dr Yamada to always be a straight shooter," she recalled, saying Yamada understood her personality. "I always wanted to know what I was up against."

In the winner's circle

Gabriel underwent the combined IV/IP chemotherapy cycles during four inpatient stays at the hospital over a five-month period, completing treatment in February 2009. Afterward, Yamada wanted her to take it easy, but Gabriel had other plans.

"I told Dr Yamada, 'I am out of here,'" she recalled. "I needed to get to Dubai for the World Cup." Two weeks later, Gabriel donned a red and black fascinator hat accented with foot-long feathers and provided on-air analysis for the international thoroughbred horse race. Her commentary from the Meydan winner's circle was simulcast to tracks all over the world.

As a young girl learning to ride, Gabriel's father had told her to "brush off and get back on the horse" every time she was bucked off. She took that same approach when experiencing setbacks during the cancer treatment. After each challenge, she said, "I always got back in the saddle."

Seven years after her diagnosis, Gabriel now divides her time between the United States in Inverness, and Dubai, where her husband works for the Dubai Racing Club and Meydan Race Course. She recently retired from a career as a racing analyst and television host and spends much of her time riding in both countries. "I ride for pleasure almost every day and take instruction for jumping," Gabriel said. "I look forward to competing in shows again."

Yamada continues to monitor Gabriel once a year for signs of recurrence. But because Gabriel has been disease-free from ovarian cancer for more than six years, Yamada says, she has already beaten the odds. MEH

First and only hospital in Houston to implant world's smallest minimally invasive cardiac pacemaker

CHI St Luke's Health-Baylor St. Luke's Medical Center (Baylor St. Luke's) announced on 5 March that it has become the first hospital in Houston to implant the world's smallest pacemaker —the Medtronic Micra™ Transcatheter Pacing System (TPS). The device was implanted as part of the global pivotal clinical trial, and Baylor St. Luke's is the only hospital in the Houston area selected to take part in the trial.

One-tenth the size of a conventional pacemaker and comparable in size to a large vitamin, the Micra TPS pacemaker is delivered directly into the heart through a catheter inserted in the femoral vein. Once positioned, the pacemaker is securely attached to the heart wall and can be repositioned or retrieved, if needed. The miniature device does not require the use of wires, known as "leads," to connect to the heart. Attached to the heart via small tines, the pacemaker delivers electrical impulses that pace the heart through an electrode at the end of the device.

"This miniaturized technology is designed to provide patients with the advanced pacing technology of traditional pacemakers via a minimally invasive approach," said John Seger, MD, Cardiac Electrophysiologist, Texas Heart® Institute, who implanted the Micra transcatheter pacemaker. "We are proud that Baylor St. Luke's was selected among an elite group of institutions to take part in this clinical trial. If positive, the results of the trial could potentially benefit the more than one million people globally who receive pacemakers each year."

In contrast to current pacemaker implant procedures, the Micra TPS implant does not require a surgical incision in the chest and the creation of a "pocket" under the skin. This eliminates a potential source of complications, and any visible sign of the device. The Medtronic Micra TPS is an investigational device worldwide.

The Micra pacemaker is a novel approach to the traditional single-chamber pacemaker in the treatment of patients with an irregular heartbeat. This miniaturized technology is designed to provide patients with the advanced pacing technology of traditional pacemakers via a minimally invasive approach. In contrast to current pacemaker implant procedures, the Micra TPS implant does not require a surgical incision in the chest and the creation of a "pocket" under the skin. This eliminates a potential source of complications, and any visible sign of the device.

● For more information contact CHI St Luke's Health International Services at *stlukesinternational@stlukeshealth.org* or call +1 832 355 3350 or visit *StLukesInternational.org*

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Researchers reveal new genetic risk hot spots for breast cancer

Scientists have discovered another 15 genetic 'hot-spots' that can increase a woman's risk of developing breast cancer, according to research published in *Nature Genetics*.

In a study funded by Cancer Research UK, scientists compared tiny variations in the genetic make-up of more than 120,000 women of European ancestry, with and without breast cancer, and identified 15 new variations – called single nucleotide polymorphisms (SNPs) – that are linked to a higher risk of the disease.

This new discovery means that a total of more than 90 SNPs associated with breast cancer have now been revealed through research.

On average, one in every eight women in the UK will develop breast cancer at some stage in their lives. The researchers estimate that about five per cent of women have enough genetic variations to double their risk of developing breast cancer – giving them a risk of approximately one in four. A much smaller group of women, around 0.7%, have genetic variations that make them three times more likely to develop breast cancer, giving them a risk of around one in three. It's hoped that these genetic markers can be used to help identify high-risk women and could lead to improved cancer screening and prevention.

Study author Professor Doug Easton, professor of genetic epidemiology at the University of Cambridge, said: "Our study is another step towards untangling the breast cancer puzzle. As well as giving us more information about how and why a higher breast cancer risk can be inherited, the genetic markers we found can help us to target screening and cancer prevention measures at those women who need them the most.

"The next bit of solving the puzzle involves research to understand more about how genetic variations work to increase a woman's risk. And we're sure there are more of these variations still to be discovered."

The study was carried out by dozens of scientists across the world working together in the Breast Cancer Association Consortium, part of the Collaborative Oncological Gene-environment Study. Each of the genetic variations, identified through this study and other research, is known to raise a woman's risk of breast cancer by a small amount – but some people have lots of these variations which add up to a more significantly increased risk.

Breast cancer is the most common type of cancer in the UK, with almost 50,000 women diagnosed every year. Death rates are falling as we learn more about the disease and how to diagnose and treat it, and around 78% of people now live for at least 10 years after diagnosis.

Nell Barrie, senior science communications manager at Cancer Research UK, said: "We're gradually uncovering breast cancer's secrets at a genetic level and learning how best to tackle this disease which still claims far too many lives. This latest study adds more detail to our genetic map of breast cancer risk and could help to develop new ways to identify women most at risk so we can spot breast cancer earlier in the future." MEH

Text message reminders boost breast cancer

Women who received a text message reminding them about their breast cancer screening appointment were 20% more likely to attend than those who were not texted, according to a study published in the *British Journal of Cancer*.

Researchers, funded by the Imperial College Healthcare Charity, trialled text message reminders for women aged 47-53 years old who were invited for their first appointment for breast cancer screening.

The team compared around 450 women who were sent a text with 435 women who were not texted. It found that 72% of women who were sent a text message reminder attended their screening appointment, compared with 60% who were not.

Text message reminders had the biggest impact on women from the most deprived areas who were 28% more likely to attend their first screening appointment if they were sent a text.

The research found that women were almost three times more likely to cancel their appointment in advance if they were sent a text message reminder.

Lead author, Robert Kerrison, at the Cancer Research UK Health Behaviour Unit at UCL said: "We all forget things now and then, and doctor's appointments are no exception – in fact, forgetting is one of the most commonly cited reasons why women miss breast cancer screening appointments.

"Our research found that a cheap, simple text-message-reminder could boost the number of women – especially those from deprived areas – attending

New treatment helps prevent early menopause in breast cancer patients

Early menopause can be prevented and fertility may be preserved in young women with early stage breast cancer, according to a study published in March in *The New England Journal of Medicine*.

A major international clinical trial has found that the risk of sudden onset of menopause can be significantly reduced by adding a drug called goserelin to the chemotherapy regimen. Women who took goserelin and wanted to have children also were more likely to get pregnant and deliver a healthy baby.

"Some of the most distressing side-effects of chemotherapy in young women with breast cancer are early and sudden onset of menopause and infertility," said Kathy Albain, MD, senior author, medical oncologist and director of the Breast Cancer Clinical Research Program at Loyola University Chicago Cardinal Bernardin Cancer. "These findings provide hope for young women with breast cancer who would like to prevent early menopause or still have children."

The overall purpose of goserelin is to temporarily put the ovaries "at rest" during chemotherapy. "We found that, in addition to reducing the risk of sudden, early menopause, and all of the symptoms that go along with menopause, goserelin was very safe and may even improve survival," Dr Albain said. "These findings are changing how we manage young women with breast cancer."

The Phase 3 multicentre trial included premenopausal women younger than 50 who had certain types of early-stage breast cancer (oestrogen and progesterone-receptor negative). For this study, 257 patients were randomly assigned to receive standard chemotherapy or chemotherapy plus goserelin.

After two years, 22% of women receiving standard chemotherapy had stopped menstruating or had elevated levels of a hormone known as FSH, an indication of reduced oestrogen production and egg supply. By comparison, only eight percent of the women receiving goserelin had stopped menstruating or had elevated FSH. The pregnancy rate was nearly twice as high in the goserelin group (21% vs. 11%).

After four years, 78% of those receiving standard chemotherapy showed no signs or symptoms of cancer compared with 89% of patients who received goserelin. Overall survival at four years was 82% in the standard chemotherapy group and 92% in the goserelin group.

Goserelin (trade name, Zoladex®) is similar to a natural hormone made by the body. It is FDA-approved for the treatment of prostate cancer, certain benign gynaecological disorders and certain breast cancers.

Goserelin is administered by injection. In the clinical trial, women assigned to the goserelin group received one shot once every four weeks during the course of their chemotherapy regimen. Side-effects of goserelin were uncommon and mostly included more symptoms related to reducing the activity of the ovaries during chemotherapy.

About 25% of breast cancers occur in women younger than 50. Breast cancer chemotherapy can trigger early menopause in women in their 20s, 30s and 40s. After completing chemotherapy, some women resume menstruating and are able to have children should they choose to do so. But for many women following chemotherapy, menopause is permanent.

Chemotherapy-induced menopause tends to come on suddenly, and consequently, symptoms are much more intense. These symptoms include irregular periods and then cessation of periods completely, vaginal dryness, hot flashes, night sweats, sleep problems, mood changes, weight gain, thinning hair, dry skin and loss of breast fullness.

"Early menopause in younger breast cancer patients can be very debilitating," Dr Albain said.

The clinical trial is named "Prevention of Early Menopause Study (POEMS) S0230." It is sponsored by SWOG national cancer research co-operative along with SWOG's collaborating groups, including the International Breast Cancer Study Group, Eastern Co-operative Oncology Group and the Alliance for Clinical Trials in Oncology. First author is Halle C.F. Moore, MD, of the Cleveland Clinic. The study was funded in part by the National Cancer Institute. Dr Albain led the design, development and conduct of this study as its senior author. MEH

screening attendance

screening, or cancelling in advance. More trials are needed to confirm this, but texting could save valuable NHS resources."

Ian Lush, chief executive of Imperial College Healthcare Charity, said: "The potential positive impact the study could have on the UK population's health is huge and goes far beyond the borders of London where the text message service was originally trialled. Research outcomes like this confirm the need for the charity to continue funding such pioneering work which will continue to help improve the health of the population."

Dr Julie Sharp, Cancer Research UK's head of health information, said: "Research like this can help tackle practical barriers that sometimes stop women from attending screening appointments. Cancer screening can save lives, but it's important to remember there are risks as well as benefits. People should also receive good quality information to help them decide whether to take up a screening invitation." MEH

How secure is your digital healthcare information?

While data-driven healthcare is fast becoming the norm in Western countries, almost every organisation in healthcare is under pressure to implement and use electronic health records (EHRs). However, many are doing so at breakneck pace and at great expense, which brings with it privacy risks and a need for digital healthcare information security.

By Thomas Omogi
CEO EFP Tactical Medical Group

Data-driven healthcare comes with a number of built-in benefits, making it an attractive option for doctors and medical facilities all over the world, with third world and less developed nations particularly eager to gain access to transform them. Those who adopt it now will enjoy:

- 1. Predictive analysis of patient readmission
- 2. Improved chronic disease management
- 3. Revenue cycle optimisation
- 4. Privacy and security monitoring
- 5. Demographic analysis for new markets

What happens when you use data to transform an industry?

In the case of healthcare, using data makes the entire field more responsive to the needs of the patient, while also increasing productivity and profit for those who work in the field. It is already happening in the UK, with the emergence of EHRs, telemedicine, and the easy collection and amalgamation of financial and insurance information, as well as patient behaviour information. Patient outcomes and satisfaction with care are improved, and doctor satisfaction with their careers is also enhanced.

In emerging markets where technology is slow and local doctor or major medical centre few and far between, embracing data-driven healthcare can make healthcare more accessible to everyone, while ensuring that care is accurate, safe, and custom-designed for each patient. Doctor/patient relationships should also improve.

And, because access to financial information is standardised in a data-driven environment, medical centres and individual physician practices will become more profitable and better able to offer their patients the best and latest treatments, especially where they may not have been available previously due to financial considerations.

How analytics is transforming the healthcare industry

Analytics help us make connections that were not possible in the past. Data can now be correlated across a wide variety of areas within an industry, and used to reveal startling new information about customer behaviour, financial aspects of a company, and the company's market performance, among other things. The use of analytics through tools like EHRs, the cloud, electronic communication with other medical providers, managed data collection services, and more, is becoming crucial in the healthcare field.

As with any new technology, data-

driven healthcare is not without its kinks. Right now, the main impediment to nationwide adoption of data-driven healthcare in the UK is a lack of data standardization from medical practice to medical practice, and major effort is being put into developing a standard protocol for data recording and sharing. The final model, worked out in more advanced markets, will act as a framework for emerging markets adopting data-driven healthcare. These markets will be able to hit the ground running by learning from our mistakes. This means that the learning curve in emerging markets should be small, and healthcare providers there should be able to reap fuller benefits from the start.

Presently, companies exist to help healthcare organizations make the change to data-driven organizations. Specialised teams move records to the cloud, set up servers in the office for accessing the data, and training both employees and doctors to use this new data-based environment for personal and financial benefit.

Data-driven healthcare is poised to change the world for the better, by saving lives, improving quality of life, and boosting economies, especially in emerging markets.

More haste, less speed

In this rush towards implementation, however, many organisations fail to create the robust security systems necessary to protect digital records and sensitive patient information. This failure, left unaddressed, may have devastating consequences for patients and the healthcare organisations that serve them.

In 2004, President George W. Bush set a goal to have electronic health records for most Americans within one decade. Five years later, President-elect Obama upped the ante by saying all Americans should have a digital health record. The Health Information Technology for Economic and Clinical Health (HITECH) provisions of the American Recovery and Reinvestment Act of 2009 make full implementation of EHR systems a national priority.

These systems are expensive, however, with one study showing an average $162,000 initial investment and $85,000 in maintenance fees to implement an electronic health information system at a five-person practice. That study also looked at the amount of time it took for HealthTexas, a physician network of 25 primary care practices in north Texas, to implement an electronic healthcare system. The study showed that it took the network implementation team and practice implementation team an average of 611 hours to prepare for and implement the electronic health record system. It took another 134 hours to prepare physicians, clinical staff and non-clinical staff to use the new systems in clinical encounters.

Despite these significant monetary and time investments, and the imperative need to initiate and maintain these systems, weak security imperils the data contained in EHRs and increases risk for patients and healthcare organisations. Even though electronic healthcare information has been around for only a few years, healthcare systems have already sustained tremendous attacks.

According to a regulatory filing from Community Health Systems, a publicly traded company that runs 206 hospitals in 29 states, hackers from China may have stolen the records of 4.5 million people of patients who saw doctors affiliated with the company within the past five years. The company says that, between April and June of 2014, hackers bypassed security systems to steal personal data that included names, social security numbers, birthdates, telephone numbers and addresses. The hackers did not access credit card numbers, medical records or clinical data but they could use the data they accessed to cause considerable harm to consumers, as social security numbers and other data can be sold in underground exchanges for use by identify thieves.

Left unaddressed, the problems with healthcare information security will create untold problems for patients, practitioners, hospitals and other healthcare organisations, and Thomas Omogi aims to address the complex solutions necessary to prevent disasters that an unsecured healthcare information environment can bring.

The importance of healthcare information security

Healthcare organisations make good targets for hackers because they are information-rich and relatively vulnerable.

According to the Fourth Annual Benchmark Study on Patient Privacy and Data Security by Ponemon Institute, criminal attacks on healthcare systems have increased 100% since the group started performing surveys in 2010. In the March 2014 study, 98% of responding healthcare organisations reported at least one data breach within the previous two years. During that time, 38% of responding organisations said they had more than five such incidents.

Economic impact of these breaches ranged from less than $10,000 USD to more than $1 million over two years, averaging about $2 million for the healthcare organisations represented in that study.

The 2014 SANS Health Care Cyberthreat Report details information gathered by Norse, a global network of sensors that gathers and analyzes more than 100 terabytes of internet traffic information daily. Between September 2012 and October 2013, the Norse threat intelligence infrastructure detected 49 917 unique malicious events and identified 375 US-based compromised healthcare-related organisations.

There are terrible ramifications of this health information getting out. Data breaches are most likely to involve healthcare records, putting patients at risk for identity theft. Thieves also target medical files and billing and insurance records.

A compromised network not only allows hackers in, but also enables them to hijack the network and send out malicious files from the IP of the compromised organisation. Norse detected 723 unique malicious source IP addresses associated with the attacks during the SANS study period. Compromised healthcare provider systems are responsible for about 72% of malicious traffic among medical organisations in the Norse analysis, while compromised healthcare business associates produce nearly 10% of malicious traffic.

The push towards digitizing healthcare records, the introduction of HealthCare.gov, and the online exchange of

electronic protected health information (ePHI) create a fertile environment for cybercrime.

Chinks in the healthcare information armour create vulnerability and insecurity within the system. The top risks leading to this healthcare information insecurity include mobile devices, embedded devices, virtualization software, viruses from social media and overly user-friendly interfaces.

Mobile devices

Mobile devices are essential in today's society, with doctors, nurses, administrators, insurance providers and patients taking advantage of modern anywhere/anytime network access. Healthcare providers use digital communication to improve patient care while administrators and insurance companies use instant access to information to manage resources. Patients tap into networks for payment information or to access personal medical records.

Pew Research Internet Project shows 90% of American adults have a cellphone and 58% have a smartphone, and new mobile devices debut each year, each with its own operating system and update versions. Nefarious players take advantage of vulnerabilities in the various OS and update versions, along with opportunities presented by outdated antivirus software, to gain access to mobile devices.

Embedded devices create portals to trouble

Embedded devices are increasingly common as tablets and mobile devices come equipped with WAN and Wi-Fi capabilities. Medication scanners, imaging devices and patient-monitoring systems facilitate tracking, monitoring and managing patient data while reducing errors. Widespread use of these embedded devices strains servers to expose vulnerabilities and creates a rich environment for virus transmission.

Virtualization software presents real vulnerabilities

About 80% of enterprises run virtualization strategies, according to Gartner, which allow them to run multiple applications on one server so that they may serve large numbers of people at once. While virtualization strategies save money and resources, the sheer volume of users increases the inherent risks of this approach.

Overly user-friendly interfaces: With friends like these, who needs enemies?

In the earliest days of health IT, computers were difficult to use so practitioners and administrators were reluctant to. The healthcare professionals that did use EHRs used shortcuts or skipped proper protocol to make using the computers easier. In an attempt to improve compliance and proper use among medical professionals and administrators, software companies have created interfaces that are extremely user-friendly. However, these interfaces often contain structural weaknesses.

The use of social media also increases the risk for system-compromising viruses and other cyber threats. Many company policies and interfaces allow users to access social media networks, which are rich breeding grounds for viruses.

Each risk alone creates vulnerabilities. Compounding risks increases cyber insecurity exponentially. Systems with multiple flaws are plagued with complex and deeply layered liabilities that endanger patients, practitioners and healthcare organisations. Many healthcare institutions apply bandages to their own servers in the hopes of controlling the attack and mitigating damages.

How some companies deal with healthcare information insecurity?

The US government and many companies operating there are not doing nearly as well as they should when it comes to healthcare security. Cyber thieves are running rampant through electronic health records to reap personal information and medical records. The government's inability to live up to its own decree of creating a functional healthcare IT system by 2014 became clear when Healthcare.gov suffered crippling problems during its launch in October 2013. Glitches are still commonplace on the website today.

On a deeper level, many feel the Affordable Care Act (ACA) increases the threat to information security and patient privacy. In fact, respondents in 69% of organisations represented in the Ponemon poll believe the ACA significantly increases or increases the risk to patient privacy and security. In that same poll, 51% of responding organisations said they were part of Accountable Care Organisation (ACO) and 66% say they saw an increased risk to patient privacy and security due to the exchange of patient health information among participants in that ACO. These numbers suggest confidence in health information exchange systems is low.

Thomas Omogi believes healthcare institutions and the federal government are not going far enough to secure servers and protect healthcare information. Patients who come to the healthcare system hoping for relief from a medical problem leave with a major security issue that could potentially cause chronic identity and financial woes.

Left unchecked, the public will lose trust in healthcare information security and possibly even forgo medical care out of fear.

Thomas Omogi believes that healthcare organisations can manage risk by implementing a proactive, preventative approach to information security.

Omogi suggests full integration of security measures that protect patient data and close network vulnerabilities associated with high traffic volume, including that caused by embedded devices and virtualization strategies. Stronger antivirus software, access restrictions and stringent control over user activities can greatly reduce virus presence. Faster identification of infected devices will help administrators maintain network security and protect crucial information to reduce server infiltration and the theft of information. Omogi also recommends the use of network access control (NAS) solutions to identify users and type of connective devices, scan the device for viruses, and assign users access to the network based on that user's role within the organisation.

Bottom line: Share with care! MEH

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Your privacy online: Health information at serious risk of abuse

There is a significant risk to your privacy whenever you visit a health-related web page. An analysis of over 80,000 such web pages shows that nine out of ten visits result in personal health information being leaked to third parties, including online advertisers and data brokers.

This puts users are risk for two significant reasons: first, people's health interests may be publicly identified along with their names. This could happen because criminals get hold of the information, it is accidentally leaked, or data brokers collect and sell the information. Second, many online marketers use algorithmic tools which automatically cluster people into groups with names like "target" and "waste". Predictably, those in the "target" category are extended favourable discounts at retailers and advance notice of sales. Given that 62 percent of bankruptcies are the result of medical expenses, it is possible anyone visiting medical websites may be grouped into the "waste" category and denied favourable offers.

For individuals, this means profiles are built based on web page visits, potentially resulting in someone being labelled a commercial risk due to the fact that they have used a site like *WebMD.com* or *CDC.gov* to look up health information for themselves, a family member, or a friend. Given that data brokers are free to sell any information they collect regarding visits to health websites, those visiting such sites are potentially at risk of being discriminated against by potential employers, retailers, or anybody else with the money to buy the data.

These findings are reported in the article "Privacy Implications of Health Information Seeking on the Web," which appeared in the March 2015 issue of *Communication of the ACM*.

Timothy Libert, a doctoral student at the University of Pennsylvania's Annenberg School for Communication wrote the article. He authored a software tool that investigates Hypertext Transfer Protocol (HTTP) requests initiated to third-party advertisers and data brokers. He found that 91 percent of health-related web pages initiate HTTP requests to third-parties. Seventy percent of these requests include information about specific symptoms, treatment, or diseases (AIDS, Cancer, etc.). The vast majority of these requests go to a handful of online advertisers: Google collects user information from 78 percent of pages, comScore 38 percent, and Facebook 31 percent. Two data brokers, Experian and Acxiom, were also found on thousands of pages.

"Google offers a number of services which collect detailed personal information such as a user's personal e.mail (Gmail), work e.mail (Apps for Business), and physical location (Google Maps)," Libert writes. "For those who use Google's social media offering, Google+, a real name is forcefully encouraged. By combining the many types of information held by Google services, it would be fairly trivial for the company to match real identities to "anonymous" web browsing data." Indeed, in 2014, the Office of the Privacy Commissioner of Canada found Google to be violating Canadian privacy laws.

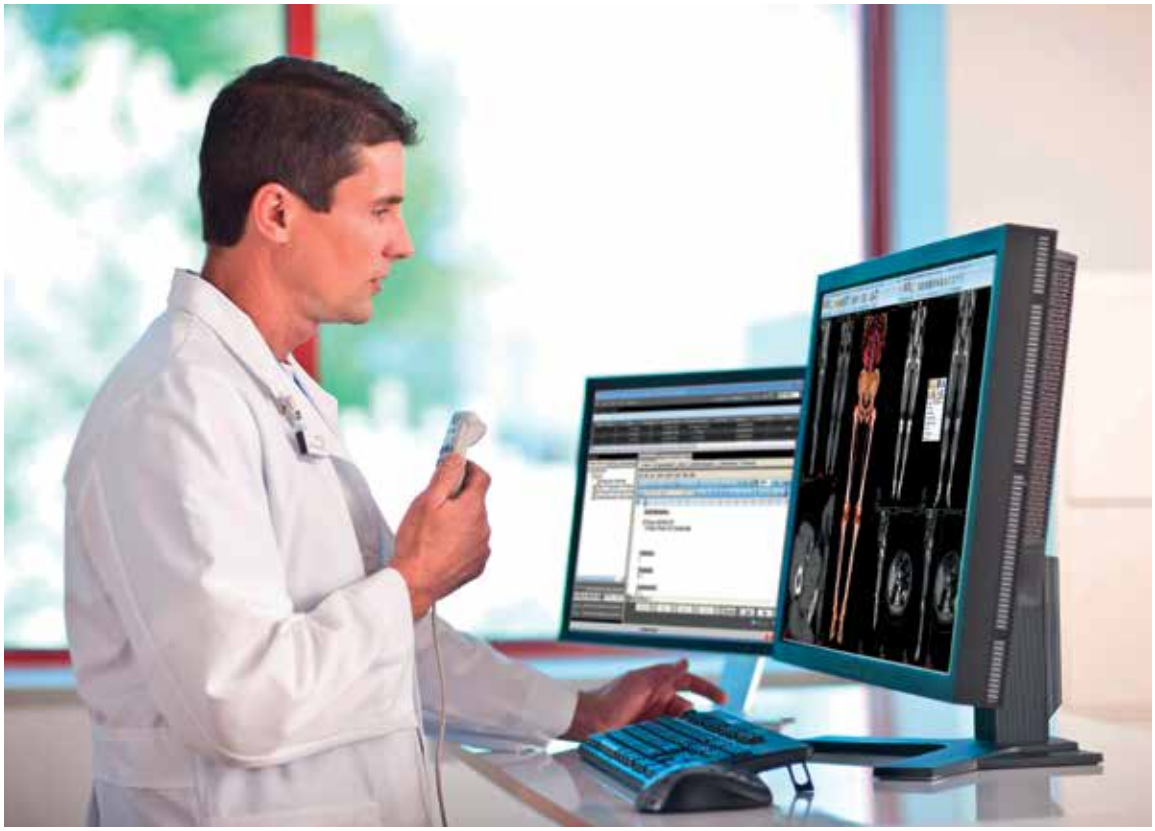
"Advertisers promise their methods are wholly anonymous and therefore benign," Libert writes. "Yet identification is now always required for discriminatory behaviour to occur." He cites a 2013 study where individuals' names were associated with web searches of a criminal record, simply based on whether someone had a "black name."

"Personal health information – historically protected by the Hippocratic Oath – has suddenly become the property of private corporations who may sell it to the highest bidder or accidentally misuse it to discriminate against the ill," Libert said. "As health information seeking has moved online, the privacy of a doctor's office has been traded in for the silent intrusion of behavioural tracking."

Online privacy has for some time been a concern. Studies conducted by Annenberg dating back indicate wariness among Americans about how their personal information may be used. And slightly more than one in every three Americans even knows that private third-parties can track their visits to health-related websites.

Libert points out that the Federal Health Insurance Portability and Accountability Act (HIPPA) is not meant to police business practices by third -party commercial entities or data brokers. The field of regulation is widely non-existent in the US, meaning that individuals looking up health information online are left exposed and vulnerable.

According to Libert, "Proving privacy harms is always a difficult task. However, this study demonstrates that data on online health information seeking is being collected by entities not subject to regulation oversight. This information can be inadvertently misused, sold, or even stolen. Clearly there is a need for discussion with respect to legislation, policies, and oversight to address health privacy in the age of the internet". MEH



Carestream shows new capabilities for its Vue Cardio PACS

Carestream demonstrated new features for its Vue Cardio PACS that include a new dashboard as well as improved image viewing, reporting and analytics functionality at the 2015 European Congress of Radiology. The latest version of Vue Cardio PACS will be available in the second quarter of 2015. Existing Vue Cardio PACS users can upgrade their systems with these features.

The latest Vue Cardio PACS platform offers a new patient-centric dashboard that provides immediate access to patient data and procedure history for diagnosis of the current exam. This includes a timeline display of prior exams, quick view of all available documents and reports, an area to enter private notes, and the ability to send a text message or email notification to a physician when a patient has a critical result finding. A clinical information management tool generates outcomes analysis and reports with the ability to build complex search rules, and a new scheduling module provides the ability to schedule procedures directly from the dashboard.

Advanced features for echo and cath viewing include support of Boston Z-scores for paediatric echo reporting, support for Stage 5 and Stage 6 stress echo exams and quantitative coronary analysis for cath exams. Vue Cardio PACS offers an integration with Cedaron for outcomes data collection and database participation and reporting.

Cardio PACS Platform Delivers Streamlined Workflow

Healthcare providers have embraced Carestream's Vue Cardio PACS platform because it delivers a streamlined reading workflow and advanced imaging tools.

Vue Cardio PACS streamlines enterprise and remote access to medical images and information for faster diagnosis, reporting, storage and distribution of clinical data. The Web-based PACS consolidates review of echocardiography, cardiac cath, ECG, nuclear cardiology and hemodynamic results with easy comparison of priors for better patient care. A zero-footprint viewer allows on-site or remote clinicians, cardiologists and referring physicians to access imaging data, reports and patient information. This viewer supports smartphone and table mobile devices utilising the device's native browser.

As part of Carestream's "Knowing Matters" strategy, Carestream's Vue portfolio of healthcare IT solutions is designed to offer greater value and insight for clinicians, foster collaboration, control costs and streamline dataflow. The company's Vue solutions amplify the clinical, business and IT value of radiology services. MEH

TAHPI is offering two certificate courses at UOWD

TAHPI offers top courses for health planning services

TAHPI is one of the oldest and largest health planning firms in the world. Well established in Australasia and the Middle East, TAHPI is committed to long-term, reliable service delivery to private and public clients. The firm is also the largest developer of software and web-based tools for healthcare facility briefing, planning and design.

1. What does TAHPI specialise in?

TAHPI specialises in:

- Healthcare Service Planning
- Healthcare Business Case Studies
- Healthcare Briefing
- Healthcare Master Planning
- Medical Planning
- Healthcare Architecture
- Healthcare Interior Design
- Healthcare Construction Documentation
- Healthcare Specifications
- Healthcare Project Management
- Room Data Sheets
- Room Layout Sheets
- 3D Fly-throughs and Immersive Virtual Reality
- Health Facility Standards and Guideline Creation
- Outsourced Licensing Application Reviews

2. What projects has TAHPI been involved with in the Middle East?

Some Middle East projects include:

- Latifa Hospital, Dubai
- Bright Point Hospital, Abu Dhabi
- City Centre Clinic, Dubai
- Specialised Mental Health Hospital, Sharjah

3. TAHPI is offering specialised courses at the University of Wollongong in Dubai (UOWD). Please tell us more?

The University of Wollongong is Dubai's oldest accredited university, with a graduate network of over 7,500 students. Since its foundation in 1993, it has offered over 20 business, finance, IT, engineering and humanities programs to both under- and post-graduate students, along with a range of short certificate courses.

What are the courses about? And the duration?

TAHPI is currently offering two certificate courses at UOWD.

The Health Service Planning short certificate course introduces students to the methodologies, theories and principles behind the planning of health services.

The Health Facility Planning short certificate course provides an introduction to specialised aspects of health facility planning for candidates interested in taking on infrastructure projects in healthcare-related sectors.

Both courses are designed for working professionals and are delivered on an intensive basis, outside of normal working hours. Each course involves 37 hours of classroom lectures, spread over three hours per evening, four days a week for two weeks, plus two seven-hour daytime sessions each Saturday. The courses begin on 23 May.

4. Why are TAHPI and UOWD offering these courses?

The Dubai Chamber of Commerce and Industry have recently estimated that the UAE healthcare market is expected to grow from Dh11.7 billion in 2005 to Dh43.7 billion by next year. UOWD and TAHPI have joined forces to meet an increasing demand for skilled professionals to drive the development of the sector and establish an educational system that works alongside advancements in healthcare equipment, techniques and infrastructure.

5. Who is the course aimed at?

For the Health Service Planning course, participants should be familiar with basic concepts and terms relating to health service planning, along with a working knowledge of epidemiology, population statistics and statistical projection. They should understand the organisation and delivery of health services, along with having basic capabilities in the use of Microsoft Office and web browsers.

> The Health Facility Planning short certificate course provides an introduction to specialised aspects of health facility planning for candidates interested in taking on infrastructure projects in healthcare-related sectors.

Health Facility Planning students should have a graduate degree in Architecture or three years' minimum practical experience as an Equipment Planner. They could also be a Health Official responsible for the evaluation and approval of applications.

6. What can participants hope to achieve from doing the course?

The courses will provide healthcare management and design professionals with the knowledge, skills and practical experience to take on specialised planning roles in one of the UAE's fastest growing sectors.

7. Who should interested parties contact for more information / registration?

Interested parties should visit *www.uowdubai.ac.ae/health-planning-courses* or call +971 4 278 1800, to apply or gather more information.

They can also visit the University of Wollongong in Dubai, Block 15, Dubai Knowledge Village or email: *info@uowdubai.ac.ae* MEH

There are different forms of carbon

Wide field of application: Activated carbon vs. Non-activated carbon as a remedy for indigestions

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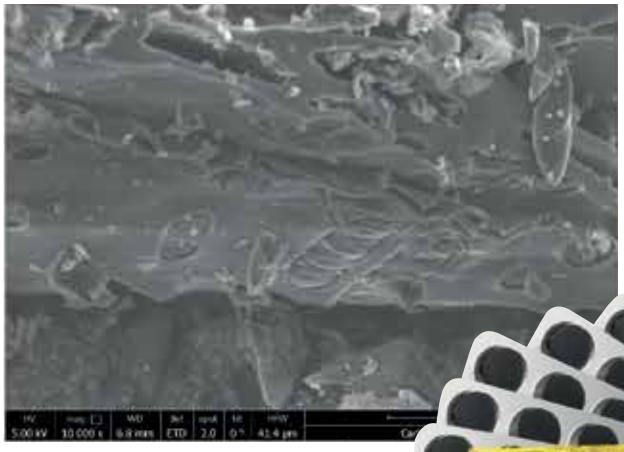
Activated carbon analyzed by means of an electron microscope



Non-activated birch carbon analyzed by means of an electron microscope

Activated carbon effectively binds toxins in the intestine

Medical activated carbon distinguishes itself by its highly porous structure and high bonding capacity with respect to small particles. In fact, there is a number of means that can be used for the absorption of toxins in the intestines. BIOCARBON® is a pure, activated carbon which is based on natural, i.e. herbal material. The preparation bears a great significance when it comes to emergency care in the event of poisonings.

Yet, BIOCARBON® has proved to be an effective remedy against acute inflammations of the bowel or severe diarrhea, as it promotes the recovery of the intestinal function. At the same time BIOCARBON® binds air- and other gas accumulations in the intestines. The acute irritation of the gastro-intestinal tract can be reduced and the diarrhea will be cured after a short time.

Non-activated birch carbon as a means to regulate the digestive system

Yet, also non-activated carbon is applied in today's medicine: Birch carbon is an essential ingredient of EUCARBON®, which has turned out to be an inevitable preparation on the market since hundreds of years. Not only, EUCARBON® comes with a laxative but also a binding effect on the bowel. Thus EUCARBON® with its unique composition of vegetable charcoal, Senna leaves, Rhubarb root as well as purified sulphur regulates slight dysfunctions of the digestion in each direction. Besides, it has turned out that the preparation provides relief from the symptoms of the widespread irritable bowel syndrome. Recent application studies confirmed the effectiveness and more than 80 percent of all physicians and patients regarded the tolerance EUCARBON® as "Excellent" or "good"!

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

Interview

The vital importance of Vitamin D

Vitamin D is an important building block for human health and is mainly produced in the skin by exposure to sunlight. This vitamin is the main regulatory body that balances the bone calcium level and therefore enhances bone development and mineralization of the skeleton. Vitamin D deficiency and insufficiency afflicts approximately one billion individuals worldwide. Although the Middle East and Africa are regions with regular sunlight throughout the year, their populations have a high prevalence of Vitamin D deficiency.

This year, Roche Diagnostics Middle East joined the 4th International Conference on Vitamin D Deficiency and its Clinical Implications in Abu Dhabi and had the opportunity to discuss the issue with **Dr Afrozul Haq**, PhD, Chairman of the Conference and Scientific Committee, Principal Scientist, Research and Development Division at VPS Healthcare in Abu Dhabi, United Arab Emirates.

From left to right: Kemi Gbolade, Marketing Specialist; Ananth Kamath, Sales Manager, Roche Diagnostics Middle East; Dr Afrozul Haq, PhD. Chairman of the Conference and Scientific Committee, Principal Scientist, Research and Development Division at VPS Healthcare in Abu Dhabi, United Arab Emirates; Raul Haj Khalil, Application Specialist.

Is Vitamin D enough of a problem that public health measures should be taken?

I believe it is an important problem that we should continue to bring it forward to the public's attention. The impact of Vitamin D deficiency on the human body is important and affects multiple areas – from muscles and bones to levels of energy and mood. If our habits continue and we are exposed to less and less sunshine, more people will be affected by Vitamin D deficiency and this will undoubtedly be reflected on the healthcare system. That is why it is important to raise awareness and educate the public in order for us to prevent Vitamin D deficiency.

With the abundance of sunshine in the Middle East region, what do you think is the reason behind Vitamin D deficiency in this part of the world?

I believe our modern lifestyle habits and, a combination of other factors, are the reason behind why more and more people are experiencing Vitamin D deficiency in the Middle East, and around the world as well. We continue to work and spend the majority of our times indoors; many start and finish their working day without seeing the sun and that is bound to have an impact on their bodies. We cannot produce Vitamin D on ourselves and, thus, need to integrate outdoors activities in our busy schedules as much as possible to ensure our bodies absorb the necessary levels of Vitamin D to remain healthy. In the Middle East, this deficiency impacts women more than men as a result of clothing habits as well. As little as 15 minutes of direct sun exposure a day on the face, arms and hands can keep us healthy.

Dr Haq, you developed a new means of testing Vitamin D levels, how does it improve on what came before?

Previous technologies did not provide a comprehensive look at both D2 and D3 levels in the human body in order to provide a proper assessment of Vitamin D levels in patients. Now we are able to do so, especially with the help of solutions provided by Roche Diagnostics that gives a quantitative determination of total vitamin D in adults. Patients on vitamin D supplements can now be monitored effectively as well thanks to the consistency of the testing results.

How do you think the International Vitamin D Conference impacts the public's awareness of Vitamin deficiency?

I strongly believe in continuous efforts to bring this issue to light and raise the public's awareness to take the appropriate measures necessary to remain healthy. Every year, the number of participating delegates has been on the rise at the conference, confirming our belief in the importance of the issue. We are confident that research and awareness efforts in thus field will be of critical value to both healthcare providers and the public. MEH

Raising awareness of autism spectrum disorder

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

Autism is a brain developmental disorder that affects how a person interacts and communicates with other people. While all people with autism spectrum disorder share certain difficulties, their condition will affect them in different ways. For example, some people with autism can live relatively independent lives but others may have accompanying learning disabilities and need a lifetime of specialist support. People with autism may also experience over- or under-sensitivity to sound, touch, light, smell and taste.

It can be difficult to create awareness of autism as people with the condition do not 'look' disabled – parents of children with autism often say that people think their child is naughty, while autistic adults find that they are misunderstood. All people with autism can benefit from a timely diagnosis and access to appropriate services and support.

April 2nd was declared World Autism Awareness Day by the United Nations to bring international attention to autism, raise awareness and highlight the insufficient support that patients receive.

Around the world many countries honoured the day with various campaign launches and fundraising events to increase awareness. Here in the UK, the National Autistic Society arranged a week-long run of events including sponsored night walks through London and baking cakes. Schools were actively encouraged to participate and the Society's website dedicated some pages with fundraising ideas and tips to raise money for those needing support.

In the US, autism is the fastest-growing developmental disorder and now affects 1 in 68 children. Many celebrities there, including actor William Shatner and singer Toni Braxton, took to Twitter to support the 'Light it up blue' campaign to raise awareness for autism spectrum disorders. This international effort encourages iconic buildings and landmarks around the world to illuminate in blue, the official colour of autism awareness. Last year, nearly 3,000 buildings in over 600 cities and 45 countries were illuminated in blue. These included the Empire State Building in New York, Tokyo Tower in Japan, the Sydney Opera House in Australia and Dubai's Burj Al Arab, as well as museums, bridges, airports and concert halls around the world.

The Dubai Autism Centre (DAC) celebrated the day by vowing to get autistic children integrated into society. It launched a campaign 'Accept me the way I am, I am a child of autism', a message being relayed across schools, communities and families. Since November, Goals UAE have organised after-school football training sessions for children with autism, raising awareness and also helping to integrate autistic children into the community. One of the problems that children with autism have to deal with is the inability to engage in group activities and interact with others, making sports a great way to help with integration.

However, it is not just children that need support. For many parents of autism sufferers, the big concern is not about passing exams at school, but what happens as they get older. They hope that their child is going to be as independent as they can be, and be as safe and happy as possible as an adult. In March next year, the UAE will hold its first international disabilities and special-needs conference to share expertise and discuss ways of increasing inclusion in schools and workplaces. Businesses are being encouraged to open their doors to the idea of employees with disabilities.

Events such as World Autism Awareness Day go a long way to helping not only those suffering with autism, but educating those who know little about it. As more and more campaigns are launched, we can all do our bit to spread the word and open our doors – as well as our hearts – to those suffering with this condition. MEH

Durbin PLC is a British company based in South Harrow, London. Established for over 50 years, Durbin is a global specialist distributor operating in niche areas of pharmaceutical and medical distribution. Comprising of eight specialist divisions, Durbin prides itself on being a trusted global partner to healthcare manufacturers. The company is fully licensed by the UK MHRA, USA Pharmacy Authorities and DEA. Durbin has offices in the UK and in the USA so can provide US, UK and European products directly from source.

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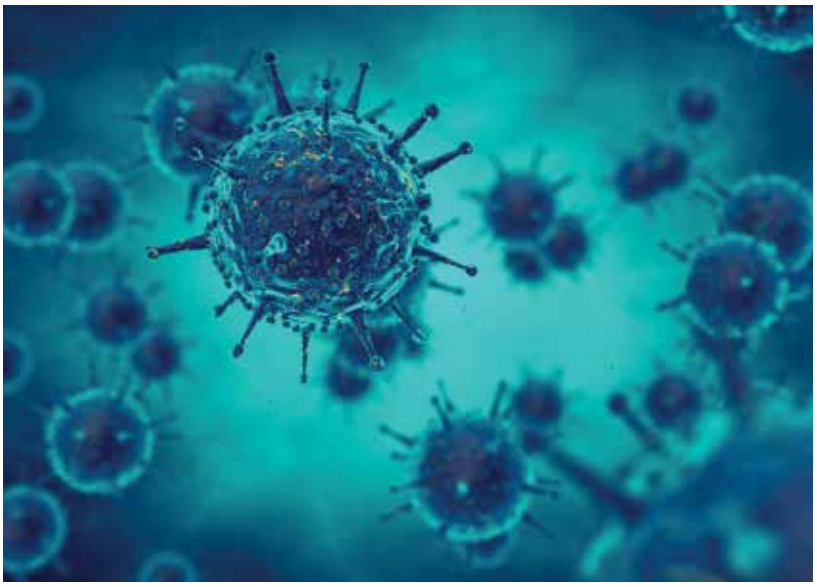
Scientists discover viral 'enigma machine'

Researchers have cracked a code that governs infections by a major group of viruses including the common cold and polio.

Until now, scientists had not noticed the code, which had been hidden in plain sight in the sequence of the ribonucleic acid (RNA) that makes up this type of viral genome.

However, a paper published in the *Proceedings of the National Academy of Sciences* (PNAS) by a group from the University of Leeds and University of York unlocks its meaning and demonstrates that jamming the code can disrupt virus assembly. Stopping a virus assembling can stop it functioning and therefore prevent disease.



Professor Peter Stockley, Professor of Biological Chemistry in the University of Leeds' Faculty of Biological Sciences, who led the study, said: "If you think of this as molecular warfare, these are the encrypted signals that allow a virus to deploy itself effectively.

"Now, for this whole class of viruses, we have found the 'Enigma machine' – the coding system that was hiding these signals from us. We have shown that not only can we read these messages but we can jam them and stop the virus's deployment."

Single-stranded RNA viruses are the simplest type of virus and were probably one of the earliest to evolve. However, they are still among the most potent and damaging of infectious pathogens.

Rhinovirus (which causes the common cold) accounts for more infections every year than all other infectious agents put together (about 1 billion cases), while emergent infections such as chikungunya and tick-borne encephalitis are from the same ancient family.

Other single-stranded RNA viruses include the hepatitis C virus, HIV and the winter vomiting bug norovirus.

This breakthrough was the result of three stages of research.

- In 2012, researchers at the University of Leeds published the first observations at a single-molecule level of how the core of a single-stranded RNA virus packs itself into its outer shell – a remarkable process because the core must first be correctly folded to fit into the protective viral protein coat. The viruses solve this fiendish problem in milliseconds. The next challenge for researchers was to find out how the viruses did this.
- University of York mathematicians Dr Eric Dykeman and Professor Reidun Twarock, working with the Leeds group, then devised mathematical algorithms to crack the code governing the process and built computer-based models of the coding system.
- In this latest study, the two groups have unlocked the code. The group used single-molecule fluorescence spectroscopy to watch the codes being used by the satellite tobacco necrosis virus, a single stranded RNA plant virus.

Dr Roman Tuma, Reader in Biophysics at the University of Leeds, said: "We have understood for decades that the RNA carries the genetic messages that create viral proteins, but we didn't know that, hidden within the stream of letters we use to denote the genetic information, is a second code governing virus assembly. It is like finding a secret message within an ordinary news report and then being able to crack the whole coding system behind it.

"This paper goes further: it also demonstrates that we could design molecules to interfere with the code, making it uninterpretable and effectively stopping the virus in its tracks."

Professor Reidun Twarock, of the University of York's Department of Mathematics, said: "The Enigma machine metaphor is apt. The first observations pointed to the existence of some sort of a coding system, so we set about deciphering the cryptic patterns underpinning it using novel, purpose designed computational approaches. We found multiple dispersed patterns working together in an incredibly intricate mechanism and we were eventually able to unpick those messages. We have now proved that those computer models work in real viral messages."

The next step will be to widen the study into animal viruses. The researchers believe that their combination of single-molecule detection capabilities and their computational models offers a novel route for drug discovery.

The research was funded by the Biotechnology and *Biological Sciences Research Council (BBSRC)*, the Engineering and Physical Sciences Research Council (EPSRC). Professor Twarock's Royal Society Leverhulme Trust Senior Research Fellowship and Dr Dykeman's Leverhulme Trust Early Career Fellowship also supported the work. MEH

Stem cells transplant shows 'miraculous' recovery for some patients with MS

According to a report in the *Daily Mail*, multiple sclerosis patients who had been wheelchair-bound for 10 years had regained the use of their legs in a groundbreaking stem cell therapy, while others who were blind could see again.

"Since we started treating patients three years ago, some of the results we have seen have been miraculous," Professor Basil Sharrack, a consultant neurologist at Sheffield Teaching Hospitals NHS Foundation Trust, said. "This is not a word I would use lightly, but we have seen profound neurological improvements."

Results from a preliminary study indicate that among patients with relapsing-remitting multiple sclerosis (MS), treatment with nonmyeloablative hematopoietic stem cell transplantation (low intensity stem cell transplantation) was associated with improvement in measures of disability and quality of life, according to a study in the *Journal of the American Medical Association*.

Fifty percent of patients with MS are unable to continue employment by 10 years from diagnosis or are unable to walk by 25 years. Despite an annual cost of approximately $47,000 per patient to treat MS, no therapy approved by the US Food and Drug Administration has been shown to significantly reverse neurological disability or improve quality of life.

Multiple sclerosis is thought to be an immune-mediated disorder of the central nervous system. Autologous (the use of one's own cells) hematopoietic (blood) stem cell transplantation (HSCT) is a form of immune suppression but unlike standard immune-based drugs, autologous HSCT is designed to reset rather than suppress the immune system. Richard K. Burt, M.D., of the Northwestern University Feinberg School of Medicine, Chicago, and colleagues studied the association of nonmyeloablative HSCT with neurological disability and other clinical outcomes in patients with relapsing-remitting MS (defined as acute relapses followed by partial or complete recovery and stable clinical manifestations between relapses; n = 123) or secondary-progressive MS (defined as a gradual progression of disability with or without superimposed relapses; n = 28) treated between 2003 and 2014.

Outcome analysis was available for 145 patients with an average follow-up of 2.5 years. On a measure of disability (Expanded Disability Status Scale [EDSS] score), there was significant improvement in 41 patients (50 percent of patients tested at two years) and in 23 patients (64 percent of patients tested at four years). "To our knowledge, this is the first report of significant and sustained improvement in the EDSS score following any treatment for MS," the authors write.

Receipt of HSCT was also associated with improvement in physical function, cognitive function and quality of life. There was also a reduction on another measure of clinical disease severity, volume of brain lesions associated with MS seen on magnetic resonance imaging (MRI). Four-year relapse-free survival was 80 percent and progression-free survival 87.

Patient selection is important in determining outcome, the researchers write, adding that results were limited because it was an observational study without a control group. "In the post hoc analysis, the EDSS score did not improve in patients with secondary-progressive MS or in those with disease duration longer than 10 years."

In an accompanying editorial, Stephen L. Hauser, M.D., of the University of California, San Francisco, noted a few conclusions that could be drawn with confidence.

"First, autologous HSCT does not appear to be effective against established progressive forms of MS and, absent new data, additional trials of these protocols are probably not indicated for patients with progressive MS. Second, immunosuppressive regimens that include HSCT appear to be effective against the relapsing-remitting form of MS, at least over several years of observation. However, it is by no means clear that the beneficial effects result from the infusion of stem cells rather than from the conditioning regimen. Given the availability of highly effective FDA-approved therapies against relapsing-remitting MS, it would seem reasonable to use these proven monotherapies in the clinical setting before considering complex HSCT regimens."

> Since we started treating patients three years ago, some of the results we have seen have been miraculous.

"Third, the mechanism of action of autologous HSCT in MS needs to be clarified. Fourth, it is important to remember MS is a chronic disease, usually arising in young adults and lasting throughout the lifespan. Many important disability-related outcomes take years or decades to develop. To understand the role of any therapy for MS, very long follow-up periods are required to meaningfully assess if the disease has indeed been rebooted over the long-term, and to increase confidence that these therapies have not caused undue harm."

Dr Sorrel Bickley, Research Communications Manager at the MS Society, corroborated: "This type of stem cell therapy is very aggressive and does carry significant risks, so we would strongly urge caution in seeking this treatment outside of a properly regulated clinical trial." MEH

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Pocket Pad takes mobile medical care to the next level

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In recent years, with the increasing popularity of commercial tablet computers, hospitals have begun incorporating tablet devices into clinical environments to improve the care and services provided to patients. However, considering operating system compatibility and stability, tablet computers specifically designed for medical platforms and applications deliver superior performance compared to generic consumer products.

The lightweight Pocket Pad: A new standard in mobile clinical care

According to a survey conducted by Kantar Media in 2013, 81% of doctors use smart phones for professional practice, and 51% also use tablet computers. However, many medical practitioners actually use their personal mobile devices or other commercially available products for work-related tasks. These devices are unable to fully support the demands of a clinical environment or satisfy the practical needs of medical personnel. To address this issue, manufacturers have developed various clinical care-specific tablet computers, such as Advantech's mobile Pocket Pad. This Windows 8.1 tablet with 7" touch screen is expressly designed for patient treatment and care, features a built-in barcode scanner, NFC, and GPS technology, and weighs a mere 400 grams. The IP54-certified (for dust and water resistance) design allows medical personnel to clean the device with rubbing alcohol, thereby limiting the spread of contagions. The Pocket Pad is also drop resistant up to 90 cm to ensure the increased durability necessary for bustling clinical settings.

Digital medical records enable data access at patient bedsides

The Pocket Pad enables doctors to remain on the go by facilitating instant access to patient records and data retrieval from PACS/HIS systems. The Windows 8.1 operating system is fully compatible with medical facility HIS systems, allowing doctors to issue orders and prescriptions directly at the point of care. Applications developed on Microsoft platforms typically require data exchange middleware to function on iOS or Android-supported devices. Thus, if the middleware is poorly designed, data losses or garbled coding can occur during data exchange operations. Additionally, generic tablet devices that lack adequate shock protection may also incur damage if accidentally dropped. One hospital in Australia that recently purchased several iPads for doctor use on ward rounds was surprised by the high device malfunction rate experienced. Internal investigations revealed that each doctor broke approximately 2 or 3 iPads over a period of 3 months. These findings indicate that although commercial tablet computers may seem more economical initially, the overall costs are often higher because hospitals must purchase multiple spares to replace damaged and malfunctioning devices.

Digitalized processes reduce clinical transcription errors

Nursing staff typically assess and record patients' vital signs several times a day. For busy medical personnel, the risk of transcription errors increases. To address this issue, the Pocket Pad is equipped with a barcode scanner to support identity recognition. Using a barcode scanner, medical personnel can obtain detailed information regarding prescriptions, patient history, and medication instructions, as well as photographically document wound conditions. These digitalized processes reduce the likelihood of transcription errors and enhance work efficiency. The Pocket Pad is equipped with an antibacterial casing that is resistant to chemicals and can be cleaned with rubbing alcohol for easy sanitation and disinfection. Furthermore, the battery supports 6 to 8 hours usage and can be fully recharged in just 2 hours. Thus, medical personnel can be assured that the Pocket Pad will last the duration of a full shift.

- For more information about the Advantech Pocket Pad or other application stories, visit: *www.advantech.com.tw/digital-healthcare* MEH

Timesco offers revolutionary lithium ion batteries and rechargers with 'one-hour' recharging

Timesco have introduced a new concept in recharging laryngoscopes and diagnostic handles – super-fast one-hour charging!

The Timesco Ion R chargers are modular and have been designed as single chargers, which can be added to with as many additional chargers as required. This enables cost saving advantages as multiple additional rechargers can be purchased only as required.

Timesco Ion R batteries are designed to power both 2.5v Xenon and 3.5v LED small AA and medium C handles and are guaranteed for a minimum of 1,000 cycles or 7 years of use; best of all, with the one-hour charging time, overnight charging times are eliminated.

The Ion R batteries have been designed to be directly charged in the Ion R rechargers, this eliminates any contamination and cross infection issues with Laryngoscopes as in the older rechargeable systems.

Timesco existing laryngoscopes and diagnostic ranges: reusable Orion, Optima Xenon and LED and Single Use Skins handles can all be charged with the new Ion R chargers and Ion R batteries.

The Timesco R rechargers are CE and ISO approved, multi voltage and are supplied complete with mains adaptors for worldwide use.

- For details on Timesco's full range of products, visit: *www.timesco.com*
- E-mail: *export@timesco.com*

Innovative features added to Carestream's DRX-Evolution Plus system

Carestream Health's newest DRX imaging system – the Carestream DRX-Evolution Plus – adds several major software and hardware enhancements to meet the changing radiology needs and budgets of healthcare providers worldwide.

Carestream has steadily expanded the capabilities of the DRX-Evolution platform since it was introduced and the new DRX-Evolution Plus will begin shipping later this year. The system's modular components, including fully automated systems, have gained wide acceptance among radiology professionals in leading hospitals and clinics.

The new DRX-Evolution Plus offers:

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

"The DRX-Evolution has earned the trust of radiology professionals around the world, largely due to continuous improvements in functionality that help technologists quickly and easily capture complex exams that previously required greater effort," said Helen Titus, Carestream's Worldwide Marketing Director for X-ray Solutions and Ultrasound. "We have developed more new software features that can boost productivity and enhance the visualization of anatomy, while simultaneously helping to reduce radiation dose."

Advanced capabilities of the DRX-Evolution Plus include:

- An innovative wall stand Bucky-angulation feature that expedites cross table and other complex X-ray exams
- Tube touch screen that allows a technologist to change techniques and view images from the tube
- Pediatric capabilities including automatic technique and image processing for seven pediatric body size categories
- Bone suppression software for optimized viewing of soft tissue
- Fast, secure log-in process using RFID badges
- A transbay option that enables fast tube movement across multiple trauma bays, which helps expedite treatment while minimizing movement of critically ill or injured patients
- Automatic acquisition and stitching for long-length and supine imaging exams; and
- IHE Dose Reporting to facilitate data sharing with a facility's dose management system.

- For more information, visit: *www.carestream.com*

GCX – a worldwide leader in medical instrument and IT mounting solutions

By dedicating itself specifically to the medical industry, GCX has been able to develop a unique understanding of the interaction between medical devices, users, and healthcare environments. The company partners with customers to create products that are utilized in virtually all healthcare settings, to provide secure positioning, mobility, and ergonomic access to medical devices and computer hardware. Overall, it's their aim to enable caregivers to deliver improved patient care.

In addition to their expertly engineered and customized products for original equipment manufacturers, GCX offer an array of internationally recognized off-the-shelf products, customer service, and support in order to provide customers with service second to none.

Since 1971, quality, reliability, and durability have been cornerstones of every GCX product. Find out what industry experience, commitment to quality, and expert engineering can do for you – contact GCX today.

- For more information, *visit: www.gcx.com*

3D printer for small molecules

3D printer for small molecules opens access to customised chemistry

Howard Hughes Medical Institute scientists have simplified the chemical synthesis of small molecules, eliminating a major bottleneck that limits the exploration of a class of compounds offering tremendous potential for medicine and technology.

Scientists led by Martin Burke, an HHMI early career scientist at the University of Illinois at Urbana-Champaign, used a single automated process to synthesize 14 distinct classes of small molecules from a common set of building blocks. Burke's team envisions expanding the approach to enable the production of thousands of potentially useful molecules with a single machine, which they describe as a "3D printer" for small molecules. Their work is described in the March 13, 2015 issue of the journal *Science*.

According to Burke, the highly customized approach that chemists have long relied on to synthesize small molecules is time-consuming and inaccessible to most researchers. "A lot of great medicines have not been discovered yet because of this synthesis bottleneck," he says. With his new technology, Burke aims to change that. "The vision is that anybody could go to a website, pick the building blocks they want, instruct their assembly through the web, and the small molecules would get synthesized and shipped," Burke says. "We're not there yet, but we now have an actionable road map toward on-demand small-molecule synthesis for non-specialists."

Nature produces an abundance of small molecules, and scientists have already adapted many of them for practical applications. The vast majority of drugs are considered small molecules, as are many important biological research tools. A wide range of technologies, including LEDs, diagnostic tools, and solar cells also rely on small molecules. "Small molecules have already had a big impact on the world," says Burke. "But we've barely touched the surface of what they're capable of achieving. In large part, that's because there's a major synthesis bottleneck that precludes accessing all of their functional potential."

Burke explains that chemists almost always develop a customized approach for manufacturing small molecules, designing a series of chemical reactions that, when applied to the right starting materials, yield the desired product. "Every time you make a molecule you have to develop a unique strategy. That customization is slow," he says. It also requires expertise. "Currently you have to have a high degree of training in synthesis to make small molecules."

In his research, Burke has been exploring the potential of small molecules to treat disease. Plants, animals, and microbes manufacture many small molecules with protein-like functions, and with some precise chemical modifications, Burke suspects it may be possible to optimize some of these natural products to mimic the function of missing proteins enough to restore patients' health. To do that, he says, his team needs to synthesize and test not just the small molecule found in nature, but also new versions with targeted modifications.

Making those molecules is a major barrier to drug discovery, Burke says. "Doing real atomistic modifications to transform nature's starting points into actual medicines is really challenging. The slow step in most cases in the synthesis. As a result, many natural products don't get worked on in any practical way."

Burke's team took cues from nature to streamline the synthesis of the molecules they were studying, developing an approach that they have now expanded to make more general. "Nature makes most small molecules the same way," Burke says. "There are a small number of building blocks that are coupled together over and over again, using the same kind of chemistry in an iterative fashion." That means small molecules are inherently modular. So when Burke's team analyzed the chemical structures of thousands of different natural products, patterns emerged. "There are building blocks that appear over and over again, and we've been able to dissect out the building blocks that are most common," he says.

The small-molecule synthesizer that Burke's team built takes these building blocks – each with two chemical connectors that can be readily linked to the corresponding part on another building block – and snaps them together like pop beads using a standard chemical reaction. The team used the approach to synthesize 14 different small molecules, ranging from relatively straightforward linear structures to densely folded molecules featuring several chemical rings.

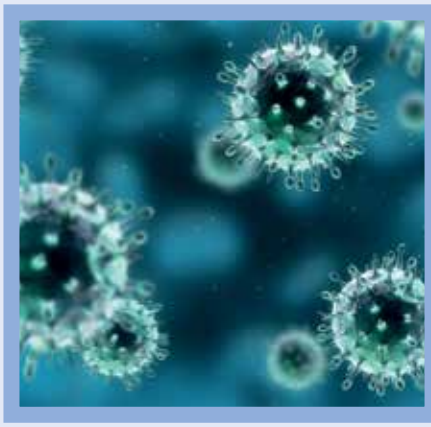
Burke's team has developed hundreds of these chemical building blocks and made them commercially available. Burke says the technology is ready now to synthesize a range of very complex natural products, meaning the atom-by-atom modifications that researchers need to optimize these molecules into therapeutic compounds or technological tools are now accessible. He has founded a company, REVOLUTION Medicines, to continue to develop the technology for this purpose.

"A 3D printer for molecules could allow us to harness all the creativity, innovation, and outside-the-box thinking that comes when non-experts start to use technology that used to only be in the hands of a select few," concluded Burke. MEH

Agenda

Selected schedule of regional medical meetings, conferences and exhibitions

Event	Date / City	Contact
May 2015		
Saudi Health 2015	18 – 20 May, 2015 Riyadh, KSA	*www.saudihealthexhibition.org*
Pervasive Health Conference 9th International Conference on Pervasive Computing Technologies on HealthCare	20 – 23 May, 2015 Istanbul, Turkey	*www.pervasivehealth.org/2015/show/cf-papers*
2nd International Emirates Conference on Minimally Invasive Surgery & NOTES	21 – 22 May, 2015 Abu Dhabi, UAE	*http://www.menaconf.com*
4th Annual UAE Epilepsy Congress	22 – 23 May, 2015 Dubai, UAE	*www.congress2015.elae.ae*
Iraq Medicare	25 – 27 May, 2015 Erbil, UAE	*www.iraqmedicare.com*
Ain Shams Obstetrics and Gynecology International Conference (ASOGIC 19)	27 – 28 May, 2015 Cairo, Egypt	*http://www.asogic.com*
June 2015		
2015 CARDIOALEX	2 – 5 June, 2015 Alexandria, Egypt	*www.cardio-alex.com*
8 – 10 June, 2015	8 – 10 June, 2015 Dubai, UAE	*www.hospitalbuild-me.com*
August 2015		
Oncology 2015 - World Congress on Cancer and Prevention Methods	27 – 29 August, 2015	*http://scientificfuture.com/oncology-2015/index.html*
September 2015		
2nd Istanbul Medical, Health, Geriatrics, Thermal, Spa & Wellness Tourism Fair & Congress	3 – 5 September, 2015 Istanbul, Turkey	*www.imtfair.com*
Epilepsy Congress Istanbul 2015	5 – 9 September, 2015 Harbiye, Turkey	*www.epilepsyistanbul2015.org/*
The 5th Oman Health Exhibition & Conference	7 – 9 September, 2015 Muscat, Oman	*http://www.omanhealthexpo.com/*
3rd International Oncology Conference	10 – 11 September, 2015 Abu Dhabi, UAE	*www.menaconf.com*
Middle East Global Summit and Expo on Vaccines & Vaccination	28 – 30 September. 2015 Dubai, UAE	*http://vaccines.global-summit.com/middleeast/*
Medicare Iraq – Baghdad	28 – 30 September, 2015	*www.iraqmedicare.com*



Agenda

Selected schedule of regional medical meetings, conferences and exhibitions

Event	Date / City	Contact
October 2015		
SKMC Multispecialty Conference 2015	3 - 17 Oct 2015 Abu Dhabi, UAE	*http://www.smc2015.ae*
Patient Safety Middle East 2015	4 – 6 October, 2015 Dubai, UAE	*www.patientsafety-me.com*
4th International Conference on Surgery	5 – 7 October, 2015 Dubai, UAE	*http://surgery.conferenceseries.com/*
7th Global Summit on Cancer Therapy	5 – 7 October, 2015 Dubai, UAE	*http://cancer.global-summit.com/middleeast/*
IMTEC 2015	7 – 8 October, 2015 Dubai, UAE	*www.medicaltravelexhibition.com*
Mental Health Congress (WFMH 2015)	16 – 19 October, 2015 Cairo, Egypt	*http://www.wfmh2015.com/*
November 2015		
6th Global Diabetes Summit and Medicare Expo	2 – 4 November, 2015 Dubai, UAE	*http://diabetesexpo.com/middleeast/*
Pharma Middle East	2 – 4 November, 2015 Dubai, UAE	*http://middleeast.pharmaceuticalconferences.com/dubai/*
Healthcare Investment MENA	2 – 4 November, 2015 Dubai, UAE	*www.healthcare investmentmena.com/*
Global Summit & Expo on Dubai Healthcare	9 – 11 November, 2015 Dubai, UAE	*www.healthcare.global-summit.com*
XXI. World World Congress of Echocardiography and Cardiology	20-22 November, 2015 Istanbul, Turkey	*http://www.worldechoistanbul.org/*

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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