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Middle East HEALTH

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November - December 2017

© Obesity Action Coalition

Obesity

- World Obesity Federation confirms obesity is 'chronic relapsing disease'
- Obesity in adolescents up 10-fold in past 4 decades

UK NHS

Innovative restructuring to meet increasing demand for services

Public Health

64th WHO EMR committee meeting resolutions pave way for better health

In the News

- Plague spreads in Iraq
- WHO condemns attacks on Syrian hospitals
- Lancet Commission calls for reform in Regenerative Medicine research
- New genetic test set to transform breast cancer prevention

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Prognosis

Obesity

There were two important developments recently in the field of obesity studies. The first is from the World Obesity Federation who now officially recognise that obesity is a 'chronic relapsing disease' with all the implications that this carries, such as the recognition that obese patients are not solely responsible for their condition and that there are other influencing factors involved. Also, that it may refocus attention on new ways to tackle the disease, such as mitigating certain environmental factors that are known to contribute to obesity, a so-called obesogenic environment.

Second, a study published in *The Lancet* – a global analysis – shows that obesity in adolescents has increased ten-fold in the past four decades. In some countries in the Middle East – Egypt, Kuwait, Qatar and Saudi Arabia – the rate of childhood obesity has grown by 20% or more. The authors note that excessive weight gain "in childhood and adolescence is associated with a higher risk and earlier onset of chronic diseases such as type 2 diabetes, worse psychosocial and educational outcomes, and lifelong harms since weight loss is hard to achieve". Read more about this major study in this issue of *Middle East Health*.

In our United Kingdom report we look at the country's National Health Service and how it is dealing with the challenge of increasing demand for its services through the implementation of various innovative programmes to reform and restructure the organisation.

The World Health Organisation's Committee for the Eastern Mediterranean Region held their 64th annual meeting in Islamabad in October. In this issue we provide a brief overview of some of the important issues discussed and resolutions adopted at the meeting. The talks were wide-ranging and included health issues such as noncommunicable diseases, health emergencies, polio, cancer, climate change, the health of adolescents and antimicrobial resistance, among others. At the meeting Dr Tedros Adhanom Ghebreyesus, Director-General of the WHO, announced the establishment of a new high-level global Commission on Noncommunicable Diseases, the aim of which will be to 'identify innovative ways to curb the world's biggest causes of death and extend life expectancy for millions of people'.

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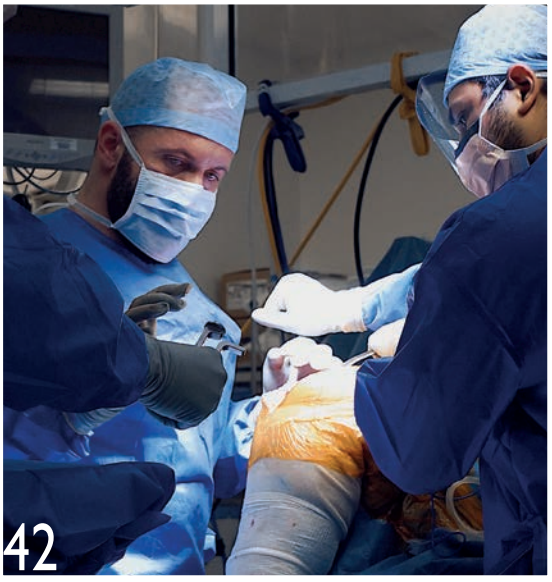

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Update from around the region

Plague spreads in Iraq's slums

According to a report in Iraq's Alghad Press, communicated by ProMED mail, Iraq's Parliamentary Health and Environment Committee revealed on 24 September 2017 the spread of plague and called for a national campaign against rodents that are causing the disease.

The deputy head of the Parliamentary Health and Environment Committee, Fares Al-Barefkani, told Alghad Press that "new cases of plague have been identified, and the causes of the disease are known and are related to the poor municipal, disease control, sewage, and landfill services, in addition to widespread residential slums."

Al-Barefkani indicated that "there are a lot of residential slums that have emerged and are not under the control of Baghdad municipality and lack health services." He called for "a serious national campaign to combat rodents in the residential neighbourhoods that cause plague and provide medicines that help to eliminate the disease" and stressed that "there is a need to support Baghdad municipality and the health and the environment directorates to educate people on how to combat plague."

Al-Barefkani added that "the Parliamentary Health and Environment Committee does not have accurate data on the number of cases because we are in the process of follow-up in all the governorates."

Zulekha 'Pink It Now' sees record numbers of women seeking screening for breast cancer

THE UAE's Zulekha Healthcare Group's breast cancer campaign, 'Pink It Now', has witnessed record breaking numbers of women attending its hospitals for free screenings and consultations. The campaign, which is now in its sixth-year, has seen a 59% increase in women attending check-ups compared to 2015.

The screenings are open to all women including residents and visitors to the UAE during October to December and is in support of the UAE's efforts to decrease cancer fatalities by 18% by 2021.

The group had the honour of being joined by His Excellency Humaid Al Qatami, Chairman of the Board and Director General of Dubai Health Authority (DHA); Dr Marwan Mohd Al Mulla, Director Health Regulations, DHA; Dr Hussain Abdul Rahman Al Rand, Assistant Undersecretary of Health Centers and Clinics Sector, Ministry of Health & Prevention, Dr Layla Al Marzouqi, Director - Dubai Medical Tourism Project, DHA, Shri Vipul, Consul General of India, and many other esteemed guests for the 2017 'Pink It Now' inauguration.

Dr Pamela Munster; His Excellency Humaid Al Qatami Chairman of the Board and Director General of DHA; Dr Zulekha Daud and Shri Vipul Consul General of India during the inauguration of Pink it Now.

The 'Pink It Now' campaign aims to raise awareness about breast cancer, the importance of early detection and the benefit of regular check-ups. Survivors shared their experiences just after the launch of an exclusive cancer support forum of Zulekha Hospital this year named "Pink Knights". The forum will continue to connect survivors who have battled against cancer and emerged successful with a new ray of life.

According to the World Health Organization (WHO), 8.8 million people died from cancer globally, of which up to 30-50 per cent of cancers could be prevented and breast cancer is the top cancer in women across the world.

Dr Pamela Munster, renowned cancer expert from the University of California in San Francisco, United States and the campaign's chief ambassador, commented: "It is these staggering figures that reveal the important role of early detection in order to save the lives of women all over the world. As healthcare professionals, it is our duty to better educate women in the UAE and empower them to take charge of their health. In doing so, the campaign helps to reduce breast cancer fatalities in the UAE."

'Pink It Now,' supported by partners Friends of Cancer Patients, Pink Caravan, Ford Warriors in Pink – Ford MENA, MAI Dubai, Musafir.com, UBER, Bhima Jewellers, Souq.com, Star TV network, BIG FM radio, Air Arabia, Pallazo Versace and The Health Bank, is one of Zulekha Hospital's core CSR initiatives, stressing the importance of strategies for cancer prevention, early detection and management of patients with the disease.

In addition to free X-ray mammogram and consultations with oncologists and gynaecologists, the hospital offers 50% discounted rates on ultrasound tests.

- To register, call 600524442 or visit *pinkitnow.zulekhahospitals.com* and download the application.

Remote heart monitoring program expands in the region

From the UAE to Saudi Arabia and as far afield as Croatia, Cleveland Clinic Abu Dhabi's cutting-edge remote heart monitoring program is helping to save patients' lives in the comfort of their own homes.

Cleveland Clinic Abu Dhabi, part of Mubadala's network of healthcare providers, and the region's leading heart care centre, launched the UAE's first remote heart monitoring program in August 2015. Run by the hospital's Heart & Vascular Institute, the program has grown to include 186 patients, all of whom are monitored via their implantable cardiac devices, such as pacemakers and defibrillators.

Real-time heart monitoring is a relatively new concept in the GCC, but a report by Swedish market research firm Berg Insight has forecast that 19 million people worldwide will be using remote patient monitoring by 2018, with the GCC earmarked as one of the biggest regions for growth.

The benefits of remote heart monitoring are numerous, and include lowering mortality and morbidity, minimizing check-ups and hospitalizations for patients, boosting patient outcomes, and improving patients' lifestyles.

"Evidence of the program's value has been proven by a sharp decline in the hospitalization of some patients with heart failure," said Dr Khalid Al Muti, an Electrophysiologist in the Heart & Vascular Institute at Cleveland Clinic Abu Dhabi.

"We have some patients who were previously admitted to the hospital regularly, but have not been admitted since they started with the remote heart monitoring program."

Patients are provided with a wireless console that, when plugged into an electrical outlet, automatically sends reports from the patient's implanted device to a secure website, which is monitored by the remote team of technicians. When the device detects fluid accumulation or an arrhythmia, the cardiologist calls the patient and provides appropriate guidance, allowing them to intercept problems between check-ups.

The same technology is used for patients with syncope (sudden collapsing), palpitations or atrial fibrillation, who are monitored via an implantable loop recorder that has been inserted under the skin. The wireless console again transmits abnormal findings to the treating cardiologists, allowing them to remotely establish a diagnosis and monitor the patient's response to therapy.

"These heart devices communicate with the patient's doctor and technicians in our remote centre. If there is an abnormality and the patient receives a shock to their heart, for instance, we can react instantly and get them to hospital quickly for treatment," said Dr Al Muti.

"The devices are for all ages. We have a young man who is 14 with a family history of heart disease, and he is receiving remote monitoring to make sure we detect any abnormalities. It was implanted after two of his immediate family members died from heart issues. At the other extreme, we have patients in their eighties who have a variety of implantable devices for remote heart monitoring, which send us reports continuously," he added.

Cleveland Clinic Abu Dhabi performs innovative heart valve surgery

Physicians at Cleveland Clinic Abu Dhabi have successfully performed a transcatheter double-valve procedure, in a clinical first for the region.

The patient, Maryam Abdallah, was a 68-year-old UAE national suffering from valvular heart disease, high blood pressure, diabetes mellitus, and a range of related conditions. She was transferred to Cleveland Clinic Abu Dhabi for treatment for severe aortic and mitral stenosis and recurrent decompensated heart failure.

Having been treated in 2012 at a Dubai hospital with a heart valve to help manage her condition, the patient experienced a sudden deterioration in 2016, when her heart started to fail again. Complicating things further, she had degeneration of her native mitral valve with severe mitral stenosis, meaning that both the aortic and mitral valves were restricted and not opening well.

In addition, multiple and prolonged hospitalizations for heart failure had significantly weakened the patient, restricting the range of potential treatments that could be performed safely. As a result of these limited treatment options, the patient was offered minimally invasive, valve-in-valve TAVR and transcatheter treatment of her mitral valve.

Rakesh M Suri MD chief of staff and chief of thoracic cardiovascular surgery at Cleveland Clinic Abu Dhabi.

Transcatheter aortic valve replacement (TAVR) is a minimally invasive procedure that offers high risk patients an alternative to standard open-heart surgery. This patient presented a unique challenge as she had two separate valve disorders and required valve-in-valve transcatheter valve replacement for the degenerated aortic valve prosthesis, as well as transcatheter mitral valve replacement (TMVR) using a transcatheter valve in the native mitral position.

Rakesh M. Suri, MD, chief of staff and chief of thoracic & cardiovascular surgery at Cleveland Clinic Abu Dhabi, explains: "The patient was too high-risk for surgical intervention due to her health

issues and more importantly due to the nature of her valve disease. Instead, a multidisciplinary heart team made the decision to perform a transcatheter double-valve procedure, placing a new valve within the existing aortic valve and another valve in the native mitral position, all performed via a small incision in her chest, in order to save her life and improve her quality of life."

Using innovative cardiac computed tomography (CT) software, the team was able to construct a three-dimensional model to help determine the size and position of the planned transcatheter aortic and mitral valves. More importantly, the team was able to simulate placement of the valves prior to surgery in order to plan the procedure accordingly.

Ahmad Edris, MD, staff physician in cardiovascular medicine and interventional cardiology at Cleveland Clinic Abu Dhabi, explains the importance of this case: "This was a complex procedure that required a lot of planning and could only be addressed by an international, multidisciplinary heart team that Cleveland Clinic Abu Dhabi was able to call upon."

"The surgical intervention was successfully performed in a hybrid operating room by a team of physicians from the Heart & Vascular Institute and required the collaborative effort of several physicians. The preclinical team worked on scenarios for approximately two weeks ahead of surgery, drawing on international expertise, and we were able to deploy the valves and the technology to make the operation possible," said Dr Suri.

The patient was discharged ten days after the surgery and is making significant progress. She has endured no repeat hospitalizations for heart failure and continues to come to Cleveland Clinic Abu Dhabi for regular check-ups.

HMC launches new blood transfer monitoring program

Qatar's Hamad Medical Corporation's (HMC) committee for blood transfusion announced a new program that monitors blood transfer procedures in the country. The Centralized Hemovigilance Program improves the quality of the blood transfusion chain, primarily focusing on safety.

Dr Aisha Ibrahim Al Malki, Assistant Executive Director of Medical Services and Chair of the Blood Transfusion Committee and Centralized Haemovigilance Program said: "This program is the first of its kind in Qatar and the Arab region and aims to improve the blood transfusion system by providing an extra level of safety for donors and recipients. It improves the quality of the blood transfusion chain, primarily focusing on safety."

A blood transfusion chain is a system for storing and transporting blood and blood products from the point of collection from a blood donor to the point of transfusion to a patient.

The new program improves the overall quality of the collection, storage, testing and distribution of blood and its components, reporting any complications or errors in blood transfer.

Dr Al Malki said the program will be initially implemented at HMC and then it will be widely introduced across all healthcare facilities in Qatar that collect, use or store blood and blood components.

Abu Dhabi's ICLDC and Healthpoint establish integrated thyroid clinic

Imperial College London Diabetes Centre (ICLDC), part of Mubadala's network of healthcare providers, and Abu Dhabi's one-stop-shop for the treatment, prevention, education and research of diabetes, has partnered with its sister facility, Healthpoint, a multi-speciality hospital in Abu Dhabi, to establish a new integrated thyroid clinic. This collaboration will enable patients to have their thyroid related problems managed in a combined multidisciplinary setting.

The joint clinic, to be located at ICLDC's Zayed Sports City branch in Abu Dhabi, will use the combined expertise of Mubadala's healthcare entities to offer an integrated approach to thyroid care. Specialist services will include consultation, testing, diagnosis, risk estimation and surgery, addressing a variety of thyroid-related conditions, such as nodules, goitres, Graves' disease, thyroid cancer and parathyroid adenoma.

The clinic will be equipped to perform a wide range of procedures, such as thyroid examination, non-invasive ultrasonography, ultrasound-guided fine-needle aspiration (FNA), thyroid nodule ablation (with sclerosing agent or thermal ablation), and various types of surgery including partial and total thyroidectomy as well as parathyroidectomy.

The expert team will comprise specialist thyroid surgeon Dr Luaay Aziz from Healthpoint in addition to three endocrinologists from ICLDC – Dr Aly Bernard Khalil, Dr Ali Bakir and Dr Safdar Naqvi.

Suhail Mahmood Al Ansari, Chairman of Healthpoint and Imperial College London Diabetes Centre, and Executive Director of Mubadala Healthcare, said: "The partnership between ICLDC and Healthpoint is set to greatly enhance Mubadala's healthcare offering. We are committed to best practice, and our latest venture aligns with our mandate of promoting medical excellence, providing the highest quality of care, and facilitating clinical collaboration and knowledge transfer."

He added: "In bringing our best medical specialists together under one roof to offer thyroid patients peace of mind, we are confident the new clinic's expertise in this specific area of medicine will go a long way towards elevating the standards of thyroid care in the region."

WHO condemns attacks on hospitals and health workers in Idlib and Hama

WHO has condemned multiple reported attacks on Syrian health facilities and personnel on 19 September 2017 which killed and injured health workers and disrupted health services for thousands of people.

According to WHO local partners, several ambulances and hospitals in Idleb province were reportedly hit by airstrikes within a few hours.

All three hospitals in Kafr Nabl, Khan Sheikhoun and Heish sub-districts are no longer in service.

An attack on a hospital specializing in

maternal and paediatric services in Heish killed one health worker and severely injured another. The hospital, which sustained significant structural damage, previously provided an average 13,150 consultations, 2,360 admissions, 1,500 major surgeries and care for 1,500 war-related trauma cases every month.

The hospitals in Kafr Nabl and Khan Sheikhoun previously each registered 2,300 and 800 consultations per month, along with surgeries and trauma care.

In northern rural Hama, near the town of Atshan, two paramedics were reportedly killed in an attack that destroyed two ambulances.

These attacks deprive civilians caught in the crossfire of the critical trauma care and health services they need.

Syria is among the most dangerous countries in the world to be a health worker – it ranks highest for attacks on health facilities and personnel. WHO has documented credible reports of nearly 100 attacks on health workers and facilities this year and 207 attacks in 2016.

WHO urges all parties to the conflict to refrain from attacking civilians and civilian infrastructure, as required by International Humanitarian Law.

New Code of Ethical Business Practice to be adopted by medical technology industry across MENA

The region's medical technology industry is in the midst of positive transformation, as members of Mecomed, the medical technology association in the Middle East and North Africa (MENA), have approved a new Code of Ethical Business Practice. The new set of guidelines is in tone with those adopted by other trade associations in North America and Europe. This serves as vital move for the region's medical devices, imaging and diagnostics industry, as it ensures the highest international ethical standards and best practice through more stringent self-regulation.

Rami Rajab, Chairman of Mecomed, said: "It has been an ongoing endeavour of the MENA medical technology industry, to not only ensure the highest standard of ethics in business practice, but also to drive its growth and evolution and adapt in a fast-changing environment. We believe that the adoption of one of the most modern and progressive codes of conduct, with strict, clear and transparent rules, is a leap forward for the industry and for healthcare in the region."

The move is expected to further strengthen patient trust in the medical sector and standards of care in the region, contributing to principal aims of the governments of the MENA region, including UAE/ KSA to provide the highest standards of healthcare locally, and to reduce the numbers of patients travelling abroad for care.

The Mecomed Member Code of Ethical Business Practice regulates all aspects of the industry's relationship with Healthcare Professionals (HCPs) and Healthcare Organizations (HCOs), such as company-organized events, arrangements with consultants, research, and financial support to medical education, amongst others. It will become binding for Mecomed corporate members by 1 January 2018. The Code also introduces a common independent enforcement mechanism, and will set the minimum standard by which industry members operate across the MENA region.

• For more information,
see: *www.mecomed.com*

National Reference Laboratory becomes first fully-automated referral lab in the UAE

National Reference Laboratory (NRL), part of Abu Dhabi's Mubadala's network of world-class healthcare providers, has become the first fully-automated referral laboratory in the UAE, enabling NRL to deliver high-quality patient results in the shortest time possible. NRL was created in partnership with and is managed by Laboratory Corporation of America Holdings (LabCorp), a world leading life sciences company providing comprehensive clinical laboratory services.

The Total Laboratory Automation (TLA) solution, installed in the core lab

of NRL at ICAD in Abu Dhabi, will further boost the capabilities of NRL, which through its network of ten laboratories currently processes more than 500,000 tests per month for over 200 clients across the MENA region.

The unique TLA set-up at NRL, one of the latest innovations by the diagnostics leader, Roche Diagnostics, covers all phases of the testing process: pre-analytics, analytics, and post-analytics. One of the key benefits of the system is the significant reduction in percentage of human error, which typically occurs in around 60-70% of sample processing in the pre-analytic stage.

Abdul Hamid Oubeisi, Chief Executive Officer of NRL, commented: "The adoption of total laboratory automation is an exciting development for our patients and staff and has already brought multiple benefits for our patients and in our operations. Backed by the highest standards of clinical laboratory services, we go an extra mile to serve our patients and clients. With about 70% of medical decisions influenced by laboratory results, NRL's investment into a completely automated system minimizing the risk of human errors, highlights our commitment to deliver high-quality care to patients and to offer fast and accurate results to our clients." MEH


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These are just three of the many experts from the University of Chicago Medicine who are now supporting new and existing hospitals around the globe. They are the same men and woman who work every day in our "hospital of the future," the Center for Care and Discovery, a new 10-story facility at the heart of the University of Chicago medical campus. An architectural and technological tour de force, our new hospital provides a home for complex specialty care with a focus on cancer, gastrointestinal disease, neuroscience, advanced surgery and high-technology medical imaging.

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Update from around the globe

Lancet Commission calls for reform in Regenerative Medicine research

A Lancet commission of senior scientists has demanded root and branch reform of the way experimental therapies associated with Regenerative Medicine are carried out.

The commission, led by cell biologist Professor Giulio Cossu from The University of Manchester, says the specialism is held back by poor quality science, unrealistic hopes, unclear funding models and unscrupulous private clinics.

Professor Cossu said: "The Commission finds that a major rethink of the social contract that supports regenerative medicine is required if it is to shift from mostly small-scale bespoke experimental interventions into routine clinical practice".

The past 10 years have seen an exponential growth in experimental therapies which include tissue engineering and cell and gene therapy.

However, though there has been some undeniable success in finding new ways to treat previously incurable diseases, such as gene therapy for congenital immune deficiencies, most therapies have had modest or no effect.

> The Commission finds that a major rethink of the social contract that supports regenerative medicine is required if it is to shift from mostly small-scale bespoke experimental interventions into routine clinical practice
> – Professor Giulio Cossu.

And products involving cells, genetically manipulated cells, viral vectors, or biomaterials with or without cells are costly and often produced in limited numbers.

The commission also argues that numbers of poorly controlled trials and poorly regulated clinics have grown in recent years.

Commission members include senior scientists from University College London, the University of Manchester, Oxford and Bristol Universities.

Although public investments in this field are massive internationally, they argue, they do not carry guaranteed commercial returns and follow a highly uncertain route to market.

The report argues: "New therapies expose patients to risks, some of which are difficult to predict even with inbuilt safeguards.

"Despite the relatively small number of clinical successes, there are gaps between people's expectations, often inflated by media reports, and the realities of translating regenerative technologies into clinical practice.

"These ethical and governance issues pose a challenge to scientists in engaging with the public, the press, and decision-making bodies in different national health systems.

"In poorly regulated states, the authorization of a novel therapy might be politically attractive, even when efficacy is unconfirmed, and the burden for taxpayers could deprive other patients of established and effective therapies."

The Commission recommends a coordinated strategy with four pillars: better science, better funding models, better governance, and better public engagement.

Dr Richard Horton, editor-in-chief of *The Lancet*, said: "Regenerative medicine offers transformative potential for the future of patient care. But that potential could be jeopardised by low quality research and a loss of public trust in stem cell science. This Lancet Commission sets out the societal opportunities of regenerative medicine. It also makes critical recommendations for protecting and strengthening both the quality of research and public confidence in this important and exciting new branch of medical science."

Recommendations of the Commission include:

- More investment to develop clinician scientists to facilitate the transition from preclinical to clinical work; more academic good medical practice facilities should be created to make trials more affordable
- Prioritising research into how cell and gene therapies can become cost-effective and scalable
- An international register of cell and biological experimental interventions
- Policy developed by the International Committee of Medical Journal Editors so that trials reporting results of cell and biological therapies will not be published unless trials have been registered in the proposed international register
- Researchers and others involved in funding, publishing, and communicating stem cell research should integrate public dialogue into their research.

doi: 10.1016/S0140-6736(17)31366-1

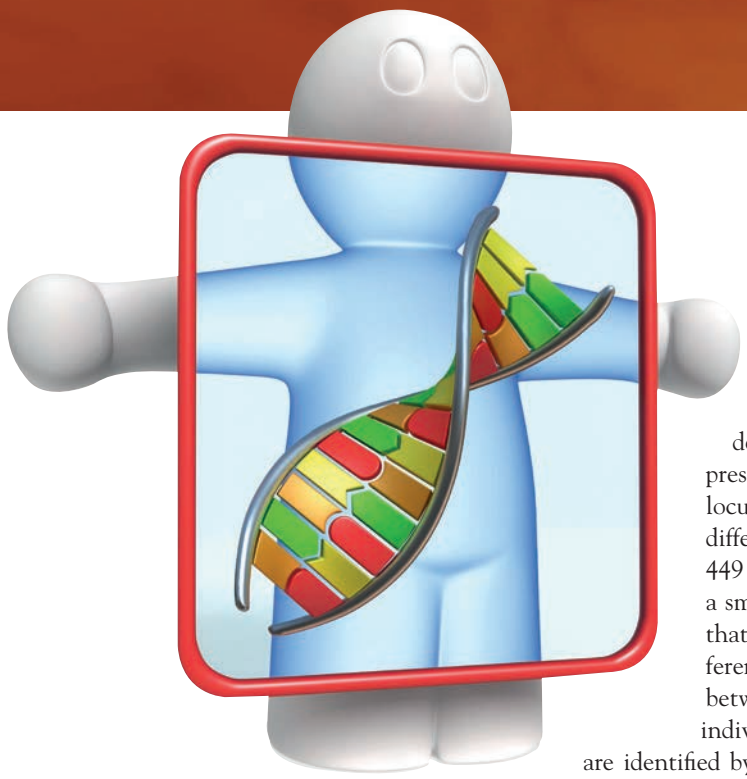
US NIH completes atlas of human DNA differences that affect gene expression

Researchers funded by the US National Institutes of Health have completed a detailed atlas documenting the stretches of human DNA that influence gene expression – a key way in which a person's genome gives rise to an observable trait, like hair colour or disease risk. This atlas is a critical resource for the scientific community interested in how individual genomic variation leads to biological differences, like healthy and diseased states, across human tissues and cell types.

The atlas is the culmination of work from the Genotype-Tissue Expression (GTEx) Consortium, established to catalogue how genomic variation influences how genes are turned off and on.

"GTEx was unique because its researchers explored how genomic variation affects the expression of genes in individual tissues, across many individuals, and even within an individual," said Simona Volpi, Ph.D , program director for GTEx at the National Human Genome Research Institute (NHGRI), who oversaw various parts of the project.

According to Dr Volpi, there was previously no resource at the scale used by GTEx that enabled researchers to study how gene expression in the liver might be different than in the lung or heart, for example, and how those differences relate to the inherited genomic variation in an individual.



Researchers involved in the GTEx Consortium collected data from more than 53 different tissue types (including brain, liver and lung) from autopsy, organ donations and tissue transplant programs. These tissues came from approximately 960 donors in total.

"GTEx depended entirely on families choosing to donate biosamples for research after the death of a loved one," said Susan Koester, Ph.D., deputy director for the Division of Neuroscience and Basic Behavioral Science and GTEx program director at the National Institute of Mental Health (NIMH). "GTEx researchers are deeply grateful for this priceless gift."

The project continues to house a biobank of collected tissue samples, as well as extracted DNA and RNA for future studies by independent researchers. The summary-level data are available to the public through the GTEx Portal <*www.gtexportal.org/home/*>, and the most recent release of the raw data has been submitted to the Database of Genotypes and Phenotypes (dbGaP) <*www.ncbi.nlm.nih.gov/gap*>, an archive of results from studies that investigate the genomic contributions to phenotypes (physical characteristics or disease states).

GTEx launched in 2010 and concluded in the summer of 2017. It was supported by the NIH Common Fund and administered by NHGRI, NIMH and the National Cancer Institute, all part of NIH.

As one example of how the atlas can be used, a new study published online in the journal *Nature*, describes the results of expression quantitative trait locus (eQTL) mapping in 44 different human tissues from 449 individuals. An eQTL is a small section of the genome that contributes to the differences in gene expression between genes and between individuals. Typically, eQTLs are identified by sequencing the genomes of genetically different individuals to determine the variation in the genome between those individuals. This is followed by determining how much each gene is being expressed. Lastly, the eQTLs are identified by establishing which specific variants are associated with differences in gene expression levels.

The authors of the study used GTEx data to catalog all known eQTLs in the human genome for the first time. As in the *Nature* study, GTEx data will help researchers understand the mechanisms of how genes are expressed in a variety of tissues, which will ultimately better inform our knowledge of how genes are mis-regulated in the context of disease. GTEx data can also be used to better understand the variations in gene expression that underlie differences among healthy individuals.

Although the GTEx project has officially wrapped up, plans for future work are already underway. An endeavour known as the Enhancing GTEx (eGTEx) project, which began in 2013, extends GTEx's efforts by combining gene expression studies with additional measurements, such as protein expression. This work is being conducted on the same tissues as in the GTEx project, providing a richer resource that integrates the complexity of how our genomes function in biologically meaningful ways.

Read the studies:

- **doi:** 10.1038/nature24277
- **doi:** 0.1038/ng.3969

Cholera task force aims to reduce deaths by 90% by 2030

An ambitious new strategy to reduce deaths from cholera by 90% by 2030 was launched on 4 October 2017 by the Global Task Force on Cholera Control (GTFCC), a diverse network of more than 50 UN and international agencies, academic institutions, and NGOs that supports countries affected by the disease.

Cholera kills an estimated 95000 people and affects 2.9 million more every year. Urgent action is needed to protect communities, prevent transmission and control outbreaks.

The GTFCC's new plan, *Ending Cholera: A Global Roadmap to 2030*, recognizes that cholera spreads in endemic "hotspots" where predictable outbreaks of the disease occur year after year.

The Global Roadmap aims to align resources, share best practice and strengthen partnerships between affected countries, donors and international agencies. It underscores the need for a coordinated approach to cholera control with country-level planning for early detection and response to outbreaks. By implementing the Roadmap, up to 20 affected countries could eliminate cholera by 2030.

"The World Health Organization is proud to be part of this new joint initiative to stop deaths from cholera. The disease takes its greatest toll on the poor and the vulnerable – this is quite unacceptable. This roadmap is the best way we have to bring this to an end," said Dr Tedros Adhanom Ghebreyesus, Director General of the World Health Organization.

"Every death from cholera is preventable with the tools available today, including use of the Oral Cholera Vaccine and improved access to basic safe water, sanitation and hygiene as set out in the Roadmap," said Dr Gebreyesus. "This is a disease of inequity that affects the poorest and most vulnerable. It is unacceptable that nearly two decades into the 21st century, cholera continues to destroy livelihoods and cripple economies. We must act together. And we must act now."

1 in 10 infants not vaccinated

Worldwide, 12.9 million infants, nearly 1 in 10, did not receive any vaccinations in 2016, according to the most recent WHO and UNICEF immunization estimates. This means, critically, that these infants missed the first dose of diphtheria-tetanus-pertussis (DTP)-containing vaccine, putting them at serious risk of these potentially fatal diseases.

Additionally, an estimated 6.6 million infants who did receive their first dose of DTP-containing vaccine did not complete the full, three dose DTP immunization series (DTP3) in 2016. Since 2010, the percentage of children who received their full course of routine immunizations has stalled at 86% (116.5 million infants), with no significant changes in any countries or regions during the past year. This falls short of the global immunization coverage target of 90%.

"Most of the children that remain un-immunized are the same ones missed by health systems," says Dr Jean-Marie Okwo-Bele, Director of Immunization, Vaccines and Biologicals at WHO. "These children most likely have also not received any of the other basic health services. If we are to raise the bar on global immunization coverage, health services must reach the unreached. Every contact with the health system must be seen as an opportunity to immunize."

Immunization currently prevents between 2–3 million deaths every year, from diphtheria, tetanus, whooping cough and measles. It is one of the most successful and cost-effective public health interventions.

National coverage estimates often mask large inequities in coverage within countries. The WHO report, *State of inequality: Childhood immunization*, highlights inequalities in childhood immunization coverage in low- and middle-income countries over the past 10 years. The report shows that global improvements have been realized with variable patterns of change across countries and that there is generally less inequality now than 10 years ago.

These findings were reinforced by a recent UNICEF study, which emphasized the cost effectiveness of investing in the poorest, most marginalized communities.

"Immunization is one of the most pro-equity interventions around," says Dr Robin Nandy, Chief of Immunizations at UNICEF. "Bringing life-saving vaccines to the poorest communities, women and children must be considered a top priority in all contexts."

Efforts to reduce inequalities related to household economic status and mother's education are needed in many countries if immunization coverage is to be improved. Additionally, more than half of the global population resides in urban areas, including in rapidly growing slums in Africa and Asia. The urban poor is a group at high risk of being un- or under-immunized.

Artemisinin resistance develops in SE Asia

The spread of artemisinin resistance in *Plasmodium falciparum* and the subsequent loss of partner antimalarial drugs in the Greater Mekong subregion presents one of the greatest threats to the control and elimination of malaria, according to a September 2017 report in *The Lancet, Infectious Diseases journal*.

This is alarming as there is a danger that the resistant strains will spread from Southeast Asia to tropical Africa as has been seen from the previous experience with resistance to chloroquine, sulphadoxine/pyrimethamine (Fansidar) and mefloquine.

Artemisinin resistance is associated with mutations in the PfKelch gene. Initially multiple independent Kelch mutations were observed, but in a recent sinister development, a single dominant artemisinin-resistant *P falciparum* C580Y mutant lineage has arisen in western Cambodia, outcompeted the other resistant malaria parasites, and subsequently acquired resistance to piperaquine, according to the journal.

Cambodia had adopted dihydroartemisinin-piperaquine as 1st-line antimalarial treatment, but has now been forced to switch its 1st line artemisinin combination treatment back to artesunate-mefloquine as a consequence.

This dominant multidrug-resistant parasite lineage, identified first in Pailin in western Cambodia and tentatively denoted as PfPailin, then spread to north-eastern Thailand and southern Laos.

"We now find that the PfPailin lineage, with associated piperaquine resistance, has spread to the south of Viet Nam where it is responsible for alarming rates of failure of dihydroartemisinin-piperaquine -- the national 1st-line treatment," the journal authors state.

New assessment scale offers uniform standards to ascertain level of consciousness

More than half a dozen different examination scales are currently in use worldwide for assessing the level of consciousness of critically ill patients. At the World Congress of Neurology in Kyoto, researchers of the USA presented a new, composite tool that enables uniform assessment and could contribute to improved communication between different disciplines.

A new, simple clinical examination can often ascertain the level of the patients' consciousness in neuro-critical care units more precisely than the examination scales currently in use. This is the conclusion of a study presented at the XXIII World Congress of Neurology (WCN 2017) in Kyoto in September.

There are more than half a dozen different scales in use worldwide to determine the level of consciousness in people suffering from impaired consciousness. One problem is that although all of the clinical assessment methods have proven reliability, they each apply a different set of criteria and rationale, which can make accurate diagnosis more difficult in day-to-day clinical operations.

"Neurologists, neurosurgeons, anaesthetists, psychiatrists, emergency rooms, intensive care units and prehospital disciplines all use differing terminology, different scales and different care routines for patients with impaired consciousness," explained study author Dr Gregory Kapinos, Assistant Professor at Hofstra Northwell

School of Medicine in Manhasset, USA. "There is no consensus on defining drops in level or content of consciousness."

To redress this situation, Dr Kapinos and his colleagues analysed the available examination scales. "We did not create a new assessment, but extracted the best components that were most pertinent or reliable from already standardized assessment methods," Dr Kapinos says. "We also clarified the terminology used in different traditional scales." The components extracted were recomposed into a larger new scale – the WCN scale. Established methods such as the Glasgow Coma Scale (GCS), the Richmond Agitation-Sedation Scale (RASS), the FOUR Score and the National Institutes of Health Stroke Scale (NIHSS) were compared with the newly composed tool.

The results were impressive: whether grading alertness, measuring response to specific stimuli, determining attention span or ascertaining integrative processing speed, the composite WCN scale can outperform the traditional assessment tools. "Our composite assessment method delivers significantly more consistent and valuable results than the standardized assessment methods," Dr Kapinos said as a conclusion. "This means that members of different medical disciplines and nurses in neurological care can reach conclusions about degree of consciousness that are congruent and free from contradiction. Compared to commonly used consciousness scales, our tool offers precise terminology and better clinical documentation, providing a basis for improved inter-professional communication. And any deterioration is detected earlier."

- Bibliographic information

WCN 2017 Abstract Kapinos et al, Proposing The WCN Scale: A Comprehensive Composite Assessment Of Consciousness In The Critically Ill Patient; XXIII World Congress of Neurology, Kyoto, Japan, 16-21 September

Outbreak of plague in Madagascar worries officials

ProMED-mail reports that an unusually deadly seasonal outbreak of plague has gripped the island nation of Madagascar. As of 6 October 2017, 258 have been sickened and 36 have died just since August 2017, according to Madagascar's Ministry of Public Health. To try to stifle the spread, the government has forbidden public gatherings, including sporting events, and schools have closed for insecticide treatments that kill plague-spreading fleas. People have swarmed pharmacies, desperately seeking face masks and any antibiotics they can get. The WHO, on 6 October 2017, announced that it has released US$1.5 million in emergency funds and delivered nearly 1.2 million antimicrobial doses to help combat the outbreak.

Plague, caused by the bacterium *Yersinia pestis*, is endemic to Madagascar and pops up all year-round. But outbreaks can erupt between September to November, with seasonal shifts in rat and flea populations. Rats, which harbour the bacteria, tend to see their populations plump and peak around harvest times in July and August. A boom in the flea population, which transmits the disease, follows in tandem. But as crops are harvested and the weather cools, the rat population shrinks, and the surging, hungry batch of fleas turns to humans.

The report says the island has been battling the disease since it arrived there on steamboats from India in 1898. In recent years, the country has seen between 275 and 675 cases annually.

But this year is different. The disease is spreading not just in rural areas; it's also spreading in cities. As of 30 September 2017, the disease had taken hold in 10 cities across the island, including the capital, Antananarivo.

"WHO is concerned that plague could spread further because it is already present in several cities and this is the start of the epidemic season, which usually runs from September to April," Dr

Charlotte Ndiaye, WHO representative in Madagascar, said.

"Plague is curable if detected in time. Our teams are working to ensure that everyone at risk has access to protection and treatment. The faster we move, the more lives we save."

It is also spreading in 2 different ways – by fleas and by people – which some have dubbed a "double plague". Usually, plague infections arise as bubonic plague, spread by flea bites. In this case – the Black Death scenario *Y. pestis* moves from the site of a flea bite on a human to the lymphatic system, taking up residence and inflaming a lymph node. This causes a painful swelling called a bubo, where the infection gets its name. If it is left untreated, the infection can spread to the blood, causing septicaemic plague, or the lungs, causing pneumonic plague.

Pneumonic plague is the most severe form. It can become a life-threatening situation in just 24 hours and can begin to spread from person to person in droplets, coughed or sneezed. Most of the people infected in the current outbreak in Madagascar have the pneumonic form.

Officials caught on to the outbreak on 11 September 2017, and cases have piled up since then.

Promed-MAIL explains that primary plague pneumonia has a short incubation period of 1-3 days, after which there is sudden onset of flu-like symptoms including fever, chills, headache, generalized body pains, weakness and chest discomfort. A cough develops with sputum production, which may be bloody, and increasing chest pain and difficulty in breathing. As the disease progresses, hypoxia and hemoptysis (coughing up blood) are prominent. The disease is invariably fatal unless antimicrobial therapy commences within 24 hours of exposure.

Patients with primary pneumonic plague generate large quantities of infectious aerosols that pose a significant risk to close contacts. CDC guidelines identify contacts within 2 meters [6.6 feet] as being at greatest risk and do not consider the organism likely to be carried through air ducts or vents. Persons who have been in contact with pneumonic plague patients or handling potentially infectious body fluids or tissues without appropriate protection should receive preventive antimicrobial therapy. The preferred antimicrobial agents for prophylaxis are tetracyclines, quinolones, or chloramphenicol. MEH

the laboratory

Medical research news from around the world

New test set to transform breast cancer prevention

Women who have a family history of breast cancer are set to benefit from a new genetic test at Manchester University NHS Foundation Trust (MFT) that assesses breast cancer risk, with plans for it to enter clinical practice within the next six months.

Developed by researchers at MFT and The University of Manchester, the test will accurately predict breast cancer risk in women who do not test positive for *BRCA1/2* gene mutations. In some instances, it may also help to refine breast cancer risk in those with the *BRCA1/2* mutations, according to research published in the *Journal of Medical Genetics*, and funded by the NIHR and Prevent Breast Cancer.

Breast cancer is the most common cancer affecting women. Having a parent or sibling with breast cancer makes women twice as likely to get breast cancer themselves. Mutations in the BRCA1/2 genes have been identified as a cause of hereditary cancer, but only account for 15% to 20% of the underlying inherited genetic trigger for the condition.

The new genetic test assesses breast cancer risk based on genetic variations (single nucleotide polymorphisms, SNPs) in an individual's DNA. The researchers found that mutations of 18 SNPs were indicative of breast cancer risk for women who did not carry BRCA1/2 mutations. These were found to have minimal effect in isolation, but when combined could increase or decrease breast cancer risk considerably.

The case-control study recruited 451 women (112 with *BRCA1/2* mutations) with a family history of breast cancer who had developed breast cancer. The researchers compared the diagnosis of invasive breast cancer and genetic profile in the case group against that of a control group of 1,605 women (691 with *BRCA1/2* mutations).

The analysis of DNA using participants' blood samples was used to determine their individual genetic makeup. To predict an overall risk estimate, the researchers used this information, alongside other risk factors including: age at first assessment; family history of first and second-degree relatives; age at first child, first period and menopause; height and weight; and history of prior non-cancerous breast disease.

Many women who were originally high risk (lifetime risk of 30% or greater) were reclassified to a lower risk where risk reducing mastectomy is not recommended. The study suggested that the number of women with *BRCA1/2* mutations who currently choose to have a mastectomy could reduce by a third – from 50 to about 36 per cent.

Prevent Breast Cancer's Predicting Risk of Cancer At Screening (PROCAS) SNP study of 10,000 women, 455 of which went on to develop breast cancer, has confirmed the accuracy of the predictions.

The study was led by Gareth Evans, Professor/Consultant in Medical Genetics and Cancer Epidemiology at The University of Manchester and Saint Mary's Hospital. He said: "This new test will help women at risk of familial breast cancer to make more informed decisions about their care.

"BRCA1 and BRCA2 are just part of what we should be looking for when assessing risk and in Manchester we plan to incorporate screening for these new genetic markers in clinical practice within the next six months.

"We are committed to improving cancer prevention through research and, with funding from the NIHR Manchester Biomedical Research Centre, we plan to develop new screening strategies and biomarkers for other common cancers, including womb, bowel, ovarian and prostate."

Becky Measures, BRCA1 carrier who had a mastectomy at Wythenshawe Hospital added: "When they find that they have the BRCA1/2 gene many women fear that they have to take action immediately. The new test will give women more options and help them to make a more informed decision."

Lester Barr, chairman of Prevent Breast Cancer, said: "With more accurate genetic testing, we can better predict a woman's risk of developing the disease and therefore offer the appropriate advice and support, rather than a 'one size fits all' approach. It's so exciting to see this additional test go into clinical practice, as it's this more tailored method that will help us on our mission to protect future generations from breast cancer."

Phase 1 trial finds DNA-based Zika vaccine candidate safe and effective

A new generation DNA-based Zika vaccine is the first to demonstrate both safety and the ability to elicit an immune response against Zika in humans, according to new research from the Perelman School of Medicine at the University of Pennsylvania, conducted in partnership with The Wistar Institute, Inovio Pharmaceuticals, and GeneOne Life Science. In results published 4 October 2017 in the *New England Journal of Medicine*, the phase 1 clinical trial showed for the first time that humans who received up to three doses of the vaccine candidate produced an immune response against Zika with minimal adverse effects, opening the door to further clinical trials for this important vaccine candidate.

The GLS-5700 vaccine is a synthetic DNA vaccine that contains the instructions for the host to mount an immune response against a specific Zika virus antigen.

"Zika virus continues to be a threat to people living in the Americas and the Caribbean," said the study's lead author, Pablo Tebas, MD, a professor of Infectious Diseases at Penn. "With these new results, we are one step closer to hopefully finding a way to prevent infection, which can cause serious birth defects and developmental delays in babies born to women who are infected with Zika."

In 2015 and 2016, Zika virus spread rapidly through Brazil, the Caribbean, and into the southern United States. However, a vaccine to prevent infection has remained elusive.

Researchers in Philadelphia, along with research teams from Miami and Quebec City enrolled 40 participants in the safety trial between August and September of 2016. Two groups of 20 participants received either one or two milligram doses of the vaccine candidate intradermally at zero, four, and 12 weeks. Each dosage was followed by the delivery of small electric currents into the skin at the site of injection, known as electroporation (EP), to facilitate optimal vaccine uptake, production of the intended antigen, and immune responses.

Two weeks after participants received the third and final dose of the vaccine, 100% developed Zika-specific antibodies and 80% developed significant neutralizing antibodies against the virus. Importantly, serum from the study participants was able to protect immune-compromised mice from developing the disease after infection with Zika virus, indicating that the vaccine-induced antibodies can prevent infection and disease in vivo. No serious adverse effects were reported.

"Synthetic DNA vaccines, such as this Zika vaccine candidate our team has developed, are an important approach to preventing emerging infectious diseases," said David Weiner, PhD, executive vice president of The Wistar Institute, director of Wistar's Vaccine & Immunotherapy Center, and co-lead author of the study. "This novel DNA vaccine was developed and implemented in just months via a platform that has advantages in temperature stability, storage, dose, and distribution compared to most traditional vaccines, making DNA vaccines an important tool to respond quickly to curb an emerging epidemic."

Increasing frequency of blood donation has no major side effects

Giving blood more frequently – up to every 8 weeks for men and every 12 weeks for women – has no major side effects and could help to increase blood stocks, according to the first ever randomised trial of blood donation involving more than 45000 people in England published in *The Lancet*.

In the UK, men can donate every 12 weeks, and women every 16 weeks, but the study showed that reducing the interval between donations by 4 weeks (to every 8 weeks for men, and every 12 weeks for women) had no major impact on the donors' quality of life, mental function or physical activity, and increased the amount of blood collected over two years by 33% (1.7 units) in men and 24% (0.85 units) in women.

However, some people who gave blood more frequently did report minor symptoms including tiredness and restless legs, and the research suggests this may have been due to giving blood.

The findings may help overcome potential risks to blood stocks, including issues attracting and retaining young donors, and increased demand caused by ageing populations. In addition, it could help to increase stocks of much-needed universal blood groups and rarer blood groups.

"This study suggests that more frequent blood donation is a feasible and safe option for donors in the UK, and gives blood services the short-term option of more frequent collection from donors if the supply falls or demand rises," says senior author Professor John Danesh, University of Cambridge, UK.

Lead author, Dr Emanuele Di Angelantonio, University of Cambridge, UK, says: "The study also showed that donors who weighed above average and those with higher initial stores of iron were able to give more blood."

The study showed there was no difference in serious adverse events, quality of life, cognitive function or levels of physical activity between people who gave blood most and least frequently.

However, people who gave blood more frequently reported more symptoms potentially related to blood donation than those who gave blood less frequently. These symptoms included feeling faint, tired, breathless, and dizzy, and were more commonly experienced by men than women. Men also had palpitations and restless legs more often than women.

Researchers uncover 'drain pipes' in the brain

By scanning the brains of healthy volunteers, researchers at the US National Institutes of Health saw the first, long-sought evidence that our brains may drain some waste out through lymphatic vessels, the body's sewer system. The results further suggest the vessels could act as a pipeline between the brain and the immune system.

"We literally watched people's brains drain fluid into these vessels," said Daniel S. Reich, M.D., Ph.D., senior investigator at the NIH's National Institute of Neurological Disorders and Stroke (NINDS) and the senior author of the study published online in eLife. "We hope that our results provide new insights to a variety of neurological disorders."

Dr Reich is a radiologist and neurologist who primarily uses magnetic resonance imaging (MRI) to investigate multiple sclerosis and other neurological disorders which are thought to involve the immune system. Led by post-doctoral fellows, Martina Absinta, Ph.D. and Seung-Kwon Ha, Ph.D., along with researchers from the National Cancer Institute, the team discovered lymphatic vessels in the dura, the leathery outer coating of the brain.

In most of the body lymphatic vessels run alongside blood vessels. They transport lymph, a colorless fluid containing immune cells and waste, to the lymph nodes. Blood vessels deliver white blood cells to an organ and the lymphatic system removes the cells and recirculates them

through the body. The process helps the immune system detect whether an organ is under attack from bacteria or viruses or has been injured.

In 1816, an Italian anatomist reported finding lymphatic vessels on the surface of the brain, but for two centuries, it was forgotten. Until very recently, researchers in the modern era found no evidence of a lymphatic system in the brain, leaving some puzzled about how the brain drains waste, and others to conclude that brain is an exceptional organ. Then in 2015, two studies of mice found evidence of the brain's lymphatic system in the dura. Coincidentally, that year, Dr Reich saw a presentation by Jonathan Kipnis, Ph.D., a professor at the University of Virginia and an author of one the mouse studies.

"I was completely surprised. In medical school, we were taught that the brain has no lymphatic system," said Dr Reich. "After Dr Kipnis's talk, I thought, maybe we could find it in human brains?"

To look for the vessels, Dr Reich's team used MRI to scan the brains of five healthy volunteers who had been injected with gadobutrol, a magnetic dye typically used to visualize brain blood vessels damaged by diseases, such as multiple sclerosis or cancer. The dye molecules are small enough to leak out of blood vessels in the dura but too big to pass through the blood-brain barrier and enter other parts of the brain.

At first, when the researchers set the MRI to see blood vessels, the dura lit up brightly, and they could not see any signs of the lymphatic system. But, when they tuned the scanner differently, the blood vessels disappeared, and the researchers saw that dura also contained smaller but almost equally bright spots and lines which they suspected were lymph vessels. The results suggested that the dye leaked out of the blood vessels, flowed through the dura and into neighbouring lymphatic vessels.

To test this idea, the researchers performed another round of scans on two subjects after first injecting them with a second dye made up of larger molecules that leak much less out of blood vessels. In contrast with the first round of scans, the researchers saw blood vessels in the dura but no lymph vessels regardless of how they tuned the scanner, confirming their suspicions.

They also found evidence for blood and lymph vessels in the dura of autopsied human brain tissue. Moreover, their brain scans and autopsy studies of brains from nonhuman primates confirmed the results seen in humans, suggesting the lymphatic system is a common feature of mammalian brains.

"These results could fundamentally change the way we think about how the brain and immune system inter-relate," said Walter J. Koroshetz, M.D., NINDS director.

Dr Reich's team plans to investigate whether the lymphatic system works differently in patients who have multiple sclerosis or other neuroinflammatory disorders.

- eLife: 10.7554/eLife.29738

Gene therapy shows promise for reversing blindness

In a laboratory study in Oxford, researchers have shown how it might be possible to reverse blindness using gene therapy to reprogram cells at the back of the eye to become light sensitive. Most causes of untreatable blindness occur due to loss of the millions of light sensitive photoreceptor cells that line the retina, similar to the pixels in a digital camera.

The remaining retinal nerve cells which are not light sensitive however remain in the eye. Samantha de Silva and colleagues used a viral vector to express a light sensitive protein, melanopsin, in the residual retinal cells in mice which were blind from retinitis pigmentosa, the most common cause of blindness in young people.

The mice were monitored for over a year and they maintained vision during this time, being able to recognise objects in their environment which indicated a high level of visual perception. The cells expressing melanopsin were able to respond to light and send visual signals to the brain. The Oxford team has also been trialling an electronic retina successfully in blind patients, but the genetic approach may have advantages in being simpler to administer.

The research was led by Professors Robert MacLaren and Mark Hankins at the Nuffield Laboratory of Ophthalmology in Oxford. Samantha de Silva, the lead author of the study said: "There are many blind patients in our clinics and the ability to give them some sight back with a relatively simple genetic procedure is very exciting. Our next step will be to start a clinical trial to assess this in patients."

- doi: 10.1073/pnas.1701589114

Typhoid vaccine proves highly immunogenic, could halve infection rate

A new typhoid vaccine has proven safe, highly immunogenic and could prevent more than half of typhoid infections according to a new study published in *The Lancet*. The study is a phase 2b trial of 112 adults and provides the first efficacy data for the leading candidate vaccine being considered for widespread use in children under 2 years, who are disproportionately affected by typhoid.

The trial uses a controlled human infection model, in which healthy volunteers are vaccinated and then deliberately exposed to the pathogen. These types of studies have been used to support the development of various vaccines (including the licenced cholera vaccine) as they can be rapidly deployed to assess vaccine efficacy.

The Vi-conjugate vaccine studied in this trial is only licensed for use in children under 2 years in India, and there are no typhoid vaccines licensed worldwide for use in children under 2 years old.

The study provides evidence to support the development of Vi-conjugate vaccines as a control measure to reduce the burden of typhoid fever, and the authors say that phase 3/4 and cost-effectiveness studies are now needed. The WHO's Strategic Advisory Group of Experts were due to consider the use of Vi-conjugate vaccines for the control of typhoid fever in October 2017, with subsequent decisions on financing being made by the Global Alliance for Vaccines and Immunisation.

Typhoid affects between 12.5 and 20.6 million people worldwide in regions with

inadequate water quality and poor sanitation, particularly in south Asia and sub-Saharan Africa. 1 in 100 cases are deadly and approximately 3% of cases become chronic carriers.

Typhoid is caused by *Salmonella enterica* serovar Typhi (S. Typhi bacteria) and is usually treated with antibiotics, but antibiotic resistance is increasing. Children are particularly susceptible to typhoid, but no vaccine is licenced for worldwide use in children under 2 years, contributing to poor adoption of typhoid immunisation programmes.

Writing in a linked Comment, Nicholas A Feasey, Liverpool School of Tropical Medicine (UK) and Myron M Levine, University of Maryland (US) say: "Results of this volunteer challenge have been awaited with much anticipation by the public health community interested in control of typhoid fever in endemic areas of south Asia and sub-Saharan Africa where S Typhi is increasingly antibiotic resistant and few treatment options remain. Vi-conjugate vaccines that have been in development represent a new instrument to help to control typhoid." They note that the most advanced conjugate vaccine, (Typbar-TCV) is licensed in India where it has been shown to elicit robust serum Vi-antibody responses in Indian infants as young as 6 months of age, and an application for pre-qualification has been submitted to WHO. They add: "If approved, this would allow the vaccine to be procured by UN agencies. However, despite evidence of safety and immunogenicity in Indian children and adults, heretofore, there has been no evidence of actual efficacy of the vaccine in diminishing the attack rate of typhoid fever upon exposure to virulent S Typhi compared with the control participants. Importantly, the authors provide the first data documenting that Typbar-TCV is protective."

US NIH releases largest publicly available chest X-ray dataset to global scientific community

The NIH Clinical Center recently released over 100,000 anonymized chest x-ray images and their corresponding data to the scientific community. The release will allow researchers across the country and around the world to freely access the datasets and increase their ability to teach computers how to detect and diagnose disease. Ultimately, this artificial intelligence mechanism can lead to clinicians making better diagnostic decisions for patients.

NIH compiled the dataset of scans from more than 30,000 patients, including many with advanced lung disease. Patients at the NIH Clinical Center, the nation's largest hospital devoted entirely to clinical research, are partners in research and voluntarily enrol to participate in clinical trials. With patient privacy being paramount, the dataset was rigorously screened to remove all personally identifiable information before release.

Reading and diagnosing chest x-ray images may be a relatively simple task for radiologists but, in fact, it is a complex reasoning problem which often requires careful observation and knowledge of anatomical principles, physiology and pathology. Such factors increase the difficulty of developing a consistent and automated technique for reading chest X-ray images while simultaneously considering all common thoracic diseases.

By using this free dataset, the hope is that academic and research institutions will be able to teach a computer to read and process extremely large amounts of scans, to confirm the results radiologists have found and potentially identify other findings that may have been overlooked.

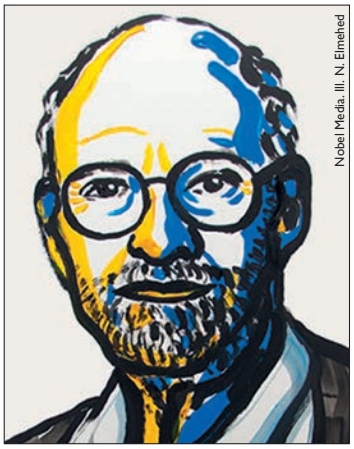
In addition, this advanced computer technology may also be able to:

- help identify slow changes occurring over the course of multiple chest x-rays that might otherwise be overlooked
- benefit patients in developing countries that do not have access to radiologists to read their chest x-rays, and
- create a virtual radiology resident that can later be taught to read more complex images like CT and MRI in the future.

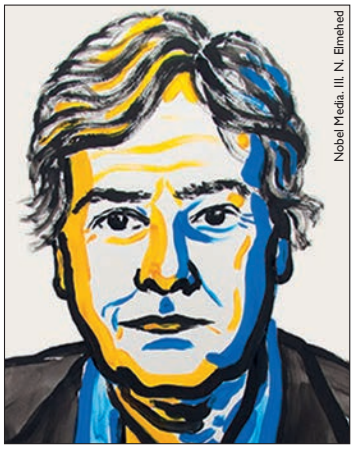
With an ongoing commitment to data sharing, the NIH research hospital anticipates adding a large dataset of CT scans to be made available as well in the coming months.

Images are available via Box: *https://nihcc.app.box.com/v/ChestXray-NIHCC* MEH

Jeffrey C. Hall



Michael Rosbash



Michael W. Young

Three scientists honoured for research of circadian rhythm

The Nobel Prize in Physiology or Medicine 2017 has been awarded jointly to Jeffrey C. Hall, Michael Rosbash and Michael W. Young for their discoveries of molecular mechanisms controlling the circadian rhythm.

Life on Earth is adapted to the rotation of our planet. For many years we have known that living organisms, including humans, have an internal, biological clock that helps them anticipate and adapt to the regular rhythm of the day. But how does this clock actually work? Hall, Rosbash and Young were able to peek inside our biological clock and elucidate its inner workings. Their discoveries explain how plants, animals and humans adapt their biological rhythm so that it is synchronized with the Earth's revolutions.

Using fruit flies as a model organism, this year's Nobel laureates isolated a gene that controls the normal daily biological rhythm. They showed that this gene encodes a protein that accumulates in the cell during the night, and is then degraded during the day. Subsequently, they identified additional protein components of this machinery, exposing the mechanism governing the self-sustaining clockwork inside the cell. We now recognize that biological clocks function by the same principles in cells of other multicellular organisms, including humans.

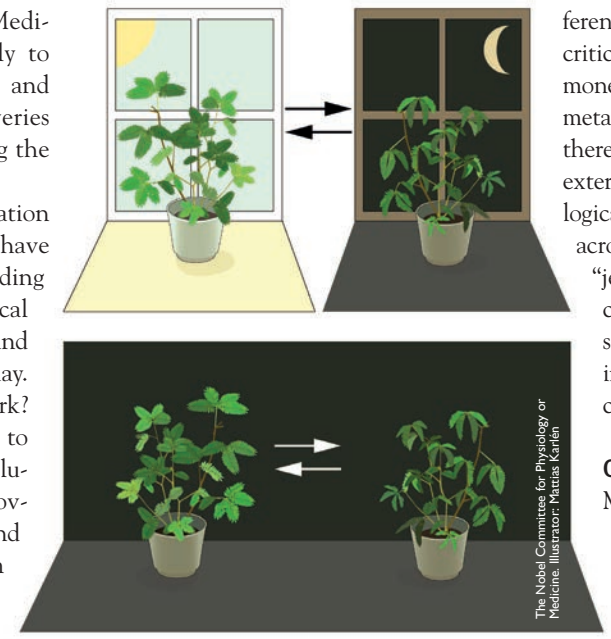


Figure 1. An internal biological clock. The leaves of the mimosa plant open towards the sun during day but close at dusk (upper part). Jean Jacques d'Ortous de Mairan placed the plant in constant darkness (lower part) and found that the leaves continue to follow their normal daily rhythm, even without any fluctuations in daily light.

With exquisite precision, our inner clock adapts our physiology to the dramatically different phases of the day. The clock regulates critical functions such as behaviour, hormone levels, sleep, body temperature and metabolism. Our wellbeing is affected when there is a temporary mismatch between our external environment and this internal biological clock, for example when we travel across several time zones and experience "jet lag". There are also indications that chronic misalignment between our lifestyle and the rhythm dictated by our inner timekeeper is associated with increased risk for various diseases.

Our inner clock

Most living organisms anticipate and adapt to daily changes in the environment. During the 18th century, the astronomer Jean Jacques d'Ortous de Mairan studied mimosa plants, and found that the leaves opened towards the sun during daytime and closed at dusk. He wondered what would happen if the plant was placed in constant darkness. He found that independent of daily sunlight the leaves continued to follow their normal daily oscillation (Figure 1). Plants seemed to have their own biological clock.

Other researchers found that not only plants, but also animals and humans, have a biological clock that helps to prepare our

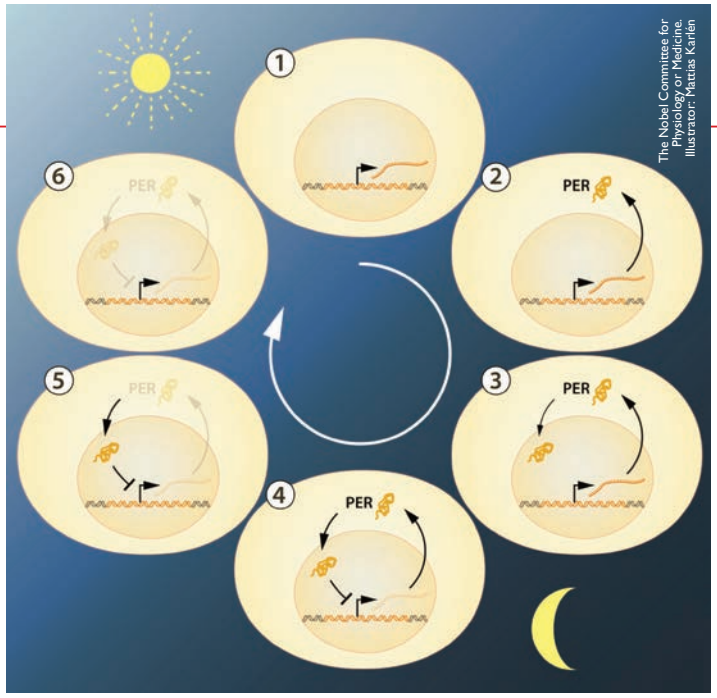


Figure 2A. A simplified illustration of the feedback regulation of the period gene. The figure shows the sequence of events during a 24h oscillation. When the period gene is active, period mRNA is made. The mRNA is transported to the cell's cytoplasm and serves as template for the production of PER protein. The PER protein accumulates in the cell's nucleus, where the period gene activity is blocked. This gives rise to the inhibitory feedback mechanism that underlies a circadian rhythm.

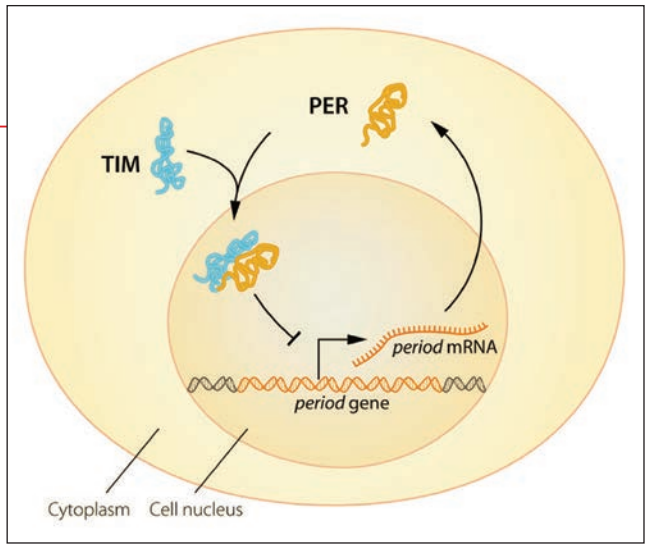


Figure 2B. A simplified illustration of the molecular components of the circadian clock.

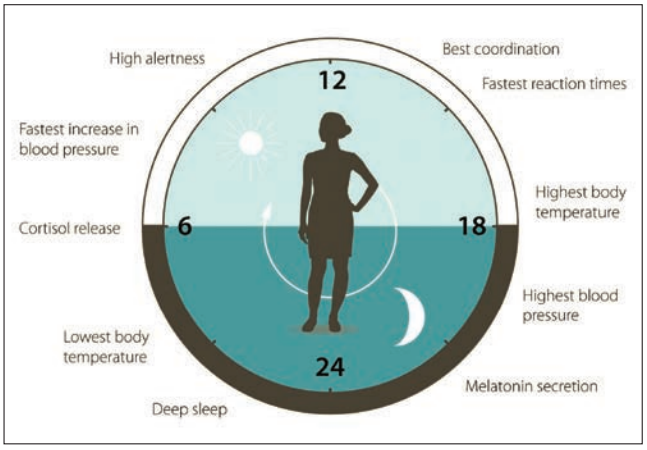


Figure 3. The circadian clock anticipates and adapts our physiology to the different phases of the day. Our biological clock helps to regulate sleep patterns, feeding behaviour, hormone release, blood pressure, and body temperature.

physiology for the fluctuations of the day. This regular adaptation is referred to as the *circadian* rhythm, originating from the Latin words circa meaning "around" and *dies* meaning "day". But just how our internal circadian biological clock worked remained a mystery.

Identification of a clock gene

During the 1970's, Seymour Benzer and his student Ronald Konopka asked whether it would be possible to identify genes that control the circadian rhythm in fruit flies. They demonstrated that mutations in an unknown gene disrupted the circadian clock of flies. They named this gene *period*. But how could this gene influence the circadian rhythm?

This year's Nobel Laureates, who were also studying fruit flies, aimed to discover how the clock actually works. In 1984, Hall and Rosbash, working in close collaboration at Brandeis University in Boston, and Young at the Rockefeller University in New York, succeeded in isolating the *period* gene. Hall and Rosbash then went on to discover that PER, the protein encoded by period, accumulated during the night and was degraded during the day. Thus, PER protein levels oscillate over a 24-hour cycle, in synchrony with the circadian rhythm.

A self-regulating clockwork mechanism

The next key goal was to understand how such circadian oscillations could be generated and sustained. Hall and Rosbash hypothesized that the PER protein blocked the activity of the *period* gene. They reasoned that by an inhibitory feedback loop, PER protein could prevent its own synthesis and thereby regulate its own level in a continuous, cyclic rhythm (Figure 2A).

The model was tantalizing, but a few pieces of the puzzle were missing. To block the activity of the period gene, PER protein, which is produced in the cytoplasm, would have to reach the cell nucleus, where the genetic material is located. Hall and Rosbash had shown that PER protein builds up in the nucleus during night, but how did it get there? In 1994 Young discovered a second clock gene, timeless, encoding the TIM protein that was required for a normal circadian rhythm. In elegant work, he showed that when TIM bound to PER, the two proteins were able to enter the cell nucleus where they blocked period gene activity to close the inhibitory feedback loop (Figure 2B).

Such a regulatory feedback mechanism explained how this oscillation of cellular protein levels emerged, but questions lingered. What controlled the frequency of the oscillations? Michael Young identified yet another gene, doubletime, encoding the DBT protein that delayed the accumulation of the PER protein. This provided insight into how an oscillation is adjusted to more closely match a 24-hour cycle.

The paradigm-shifting discoveries by the laureates established key mechanistic principles for the biological clock. During the following years other molecular components of the clockwork mechanism were elucidated, explaining its stability and function. For example, this year's laureates identified additional proteins required for the activation of the *period* gene, as well as for the mechanism by which light can synchronize the clock.

Keeping time on our human physiology

The biological clock is involved in many aspects of our complex physiology. We now know that all multicellular organisms, including humans, utilize a similar mechanism to control circadian rhythms. A large proportion of our genes are regulated by the biological clock and, consequently, a carefully calibrated circadian rhythm adapts our physiology to the different phases of the day (Figure 3). Since the seminal discoveries by the three laureates, circadian biology has developed into a vast and highly dynamic research field, with implications for our health and wellbeing. MEH

Resolutions set to strengthen public health

Ministers and delegates at the 64th Session of the WHO Eastern Mediterranean Region.

Several important announcements were made, and resolutions endorsed, at the 64th Session of WHO's Regional Committee for the Eastern Mediterranean held in Islamabad from 9-12 October.

Among the topics discussed were Noncommunicable Diseases, health emergencies, polio, cancer, climate change, the health of adolescents and antimicrobial resistance, among others. The resolutions are expected to have a positive impact on the health of populations in countries of the Eastern Mediterranean Region.

Cancer is the second leading cause of death worldwide and estimates indicate that by 2030 the Eastern Mediterranean Region will have the highest increase in cancer burden among all six WHO regions. In its final resolutions, the Regional Committee endorsed a regional framework for action on cancer prevention and control to scale up guidance to Member States in support of international commitments and to guide country decision-making on policy options and priority interventions for cancer prevention and control according to national contexts.

Climate change is among the biggest global health threats of the 21st century posing serious, yet preventable, effects on human health and exacerbating morbidity and mortality, especially among vulnerable populations. The Regional Committee endorsed a framework for action on climate change and health to guide the health sector response to climate change, in collaboration with other health-determining sectors, and build the resilience of health systems.

The health of adolescents has for too long been neglected, but is now being recognized as central to the achievement of the Sustainable Development Goals. The Regional Director expressed support for the

We mourn the death of Dr Mahmoud Fikri

It is with great sadness that we observe the death of Dr Mahmoud Fikri, WHO Regional Director for the Eastern Mediterranean. He passed away on 17 October on his way to participate in the global high-level summit on Noncommunicable Diseases, in Montevideo, Uruguay.

Dr Mahmoud Fikri will long be remembered for his kindness, care, generosity and humane leadership.

Dr Fikri took office as WHO's Regional Director on 1 February 2017. In the short period of time since assuming office, his dedication and diligence stood out. He was responsible for the recent and highly successful meeting of the Regional Committee for the Eastern Mediterranean held in Islamabad, Pakistan, which was attended by Ministers of Health and delegations from the 22 countries of the Region. In the meeting, Dr Fikri's vision and roadmap were endorsed and will pave the way for addressing the health priorities of the Region for the coming five years.

Dr Fikri was formerly the adviser to the Minister of Health of United Arab Emirates and was previously the UAE's Assistant-Undersecretary for Preventive Medicine and Health Policies Affairs in the Ministry.

All staff at Middle East Health extend their heartfelt condolences to his family and all his loved ones.

Commission on Noncommunicable Diseases

At the 64th Session of WHO's Regional Committee for the Eastern Mediterranean, Dr Tedros Adhanom Ghebreyesus, Director-General of the World Health Organization (WHO), announced the establishment of a new High-level global Commission on Noncommunicable Diseases (NCDs).

The commission's aim is to identify innovative ways to curb the world's biggest causes of death and extend life expectancy for millions of people. The commission will support ongoing political efforts to accelerate action on cardiovascular disease, cancers, diabetes and respiratory disease, as well as reducing suffering from mental health issues and the impacts of violence and injuries.

The High-level global Commission will be chaired by Dr Sania Nishtar, a prominent global advocate for action against NCDs, former Federal Minister of the Government of Pakistan and civil society leader. Dr Nishtar has also previously served as co-chair of the WHO Commission on Ending Childhood Obesity.

NCDs kill approximately 40 million people globally each year, accounting for 70% of all deaths. About 15 million of those deaths are in people between the ages of 30 and 69. Low- and middle-income countries are particularly affected by NCDs with more than 80% of all deaths from NCDs occurring in these countries.

In 2015, world leaders committed to reduce premature deaths from NCDs by one third by 2030 as part of the Sustainable Development Goals. Recent WHO reports indicate that the world will struggle to meet that target.

"We urgently need new approaches and action on a dramatically different scale if we are to stop people dying unnecessarily from noncommunicable diseases," said Dr Tedros.

"I am committed to engaging the very best people in the world to address our health challenges," he added. "So, I am especially pleased that Dr Nishtar has agreed to lead this commission. I know she will bring impressive knowledge, credibility, and commitment to this effort."

Health-in-all-Policies model and described the global school-based student health survey, designed to help countries measure and assess the behavioural risk factors and protective factors of young people as an important policy-making tool.

A resolution on antimicrobial resistance was adopted by the Regional Committee, urging Member States to develop and en-

dorse national action plans in alignment with the global action plan, establish a high-level coordination mechanism and allocate adequate resources and develop and enforce policies and regulations to prevent purchase of antibiotics without prescription.

The next session of the Regional Committee will be held in Khartoum, Sudan, from 15 to 18 October 2018. MEH

YouTube

Watch sessions from the 64th Regional Committee for the Eastern Mediterranean
http://tinyurl.com/y8zp87a3

Watch the video of WHO Eastern Mediterranean Region work in health emergencies
www.youtube.com/c/WHOEMR

Roadmap for the Eastern Mediterranean Region

At the conference, Dr Mahmoud Fikri, WHO Regional Director for the Eastern Mediterranean, presented the Annual Report of the Regional Director for the year 2016, and updated participants on progress in a number of key areas.

Looking ahead, Dr Fikri also shared his vision on the way forward for the Region through a roadmap that underpins his five-year mandate as Regional Director. Through the roadmap, the Regional Director aims to increase WHO's capacity to meet the needs of Member States by ensuring that WHO in the Region becomes ever increasingly effective, efficient, accountable and transparent.

The roadmap has been developed around four interrelated pillars that translate the vision into action to guide WHO's work: (1) public health priorities, (2) enabling factors, (3) WHO's presence in countries, and (4) WHO's working environment.

The five priority areas identified for targeted action are: (a) emergencies and health security; (b) prevention and control of communicable diseases; (c) prevention and control of noncommunicable diseases, mental health and substance abuse; (d) maternal, neonatal, child and adolescent health; and (e) health systems strengthening to achieve universal health coverage.

on the WEB **Download the Roadmap of WHO's work for the Eastern Mediterranean Region – 2017-2021**
http://applications.emro.who.int/docs/EMROPUB_2017_19695_EN.pdf

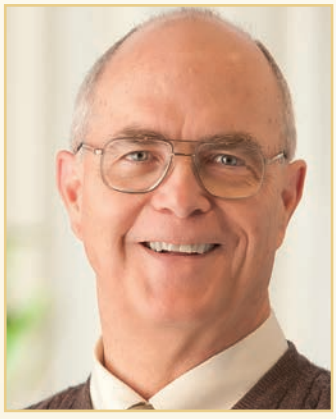
Oman's Dr Yasmin Ahmed Jaffer honoured

From left to right: Saira Afzal Tarar, Pakistan's Federal Minister for National Health Services, Regulations and Coordination; Dr Tedros Adhanom Ghebreyesus, WHO Director General; Dr Mahmoud Fikri, WHO Regional Director for the Eastern Mediterranean; and Dr Yasmin Ahmed Jaffer, recipient of the Dr A.T. Shousha Foundation Prize for 2017 and Dr Ahmed Mohammed Obaid Al Saidi, the Minister of Health of the Sultanate of Oman.

This year's Dr A.T. Shousha Foundation Prize was awarded to Dr Yasmin Ahmed Jaffer of Oman for her significant contribution to public health in Oman, particularly in the area of women's and children's health. Dr Ahmed Jaffer graduated from the College of Medicine, Baghdad University, in 1983, and received her Master's degree in mother and child health from the Institute of Child Health, University College London, in 1989.

Dr Ahmed Jaffer is currently senior consultant and advisor in the Directorate-General for Primary Health Care, Oman.

Cancer care: Clinical research is rapidly transforming our ability to benefit patients



By **Professor James O. Armitage,** MD*

One poignant thing about being an oncologist for many years is remembering patients you saw in past years whose outcome might have been much different if only they had been diagnosed a few years later. Clinical and basic research is rapidly transforming our ability to benefit patients.

When I began practicing medicine, patients with Hodgkin lymphoma or the aggressive non-Hodgkin lymphomas who did not respond to standard therapy were doomed to die of their disease in almost every case. However, one of the exciting parts of my career was being involved in developing autologous bone marrow transplantation as a treatment for these patients. Instead of palliative care, patients had a chance for a curative option that was successful in many of them. Had these patients we cured been diagnosed earlier, they would have missed the chance for this new treatment approach and would have died of their lymphoma.

A sister of one of my colleagues was diagnosed with chronic myeloid leukemia. Although she benefited transiently from *busulfan* and then from *interferon*, her disease progressed, transformed to acute leukemia, and she died. She died within months of the drug *imatinib* becoming available for clinical use. Had her illness began only a little later, it is likely that she would still be alive today taking imatinib daily.

Years ago, I regularly cared for patients with multiple myeloma. This was one of the most difficult of all the hematologic malignancies. The standard treatment was a combination of *mephalan* and *prednisone*. Most patients did not have striking benefit and the median survival was approximately 2-3 years. The patients suffered greatly from fatigue and bone pain. I felt it one of the most frustrating illnesses to see. However, if those patients would be diagnosed in this decade they would benefit from numerous new agents that have turned multiple myeloma for many patients into a chronic disease. The median survival is now on the order of 10 years and most patients are well and functioning normally during most of that time.

Clinical research, such as that being done at the University of Nebraska Medical Center/Nebraska Medicine (UNMC) and other similar institutions around the world, really matters. Not every new idea works, and sometimes doing these studies is slow and frustrating. However, if one stands back and looks at the impact this has had upon our world, the results are heartwarming. There are many people alive today because of the results of clinical studies in treating malignancies, and some of the diseases that are today almost always fatal will not be as a result of work that is being done right now. To have advantage of "cutting edge" knowledge and research it is important to receive care or be seen for a consultation at an institution involved in clinical research in your cancer.

Collaboration

Nizar Mamdani, executive director of UNMC's International Healthcare says: "Dr Armitage and his expert team are remarkable examples of the caliber of specialists and researchers working tirelessly to help provide better treatment options.

"Through collaborative strategic partnerships with 124 institutions in 44 countries, we continue to provide innovative treatment options, as well as specialized tele-pathology and second opinion consultation services for cancer care, neurology and transplantation patients around the world." UNMC also provides no-cost training and educational programs. "Our customized training programs facilitate patients around the globe to be the ultimate beneficiaries of the most advanced treatment options and empower them to receive the latest treatments in their own home countries," says Mamdani.

*Dr Armitage is globally recognized as a leading expert on non-Hodgkin lymphoma, and played a critical role in advancing bone marrow transplantation. Dr Armitage is a practicing Hematologist & Oncologist at UNMC. He has been in research as well as treating patients with both Non-Hodgkin and Hodgkin Lymphoma, as well as Chronic Lymphocytic Leukemia. He is a recipient of the 2014 American Society of Clinical Oncology's Special Recognition Award, as well as the past President of ASCO.

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Number of children, adolescents with obesity increases ten-fold since 1975

Egypt, Kuwait, Qatar and Saudi Arabia among countries showing high increase

Despite the rise in obesity, more children and adolescents remain underweight than obese globally, highlighting the need to improve food security to tackle, at the same time, under-nutrition and excessive weight gain, according to a report in *The Lancet*.

Worldwide, there has been a more than ten-fold increase in the number of children and adolescents with obesity in the past four decades, increasing from 5 million girls in 1975 to 50 million in 2016, and from 6 million to 74 million boys, according to a new global analysis of trends in child and adolescent obesity in 200 countries, published in *The Lancet*.

Rates of child and adolescent obesity were highest (above 30%) in some islands in Polynesia, and were around 20% or higher in the USA and some countries in the Middle East and North Africa (e.g. Egypt, Kuwait, Qatar and Saudi Arabia) and the Caribbean (e.g. Bermuda and Puerto Rico). Overall, the global prevalence of child and adolescent obesity increased from 0.7% to 5.6% for girls, and from 0.9% to 7.8% for boys.

Despite the increase in child and adolescent obesity, globally more children remain moderately or severely underweight than obese, with 75 million girls moderately or severely underweight in 2016 and 117 million boys. Almost two thirds of the world's children and adolescents who are moderately or severely underweight lived in south Asia.

The study, led by Imperial College London (UK) and the World Health Organisation (WHO) and published ahead of World Obesity Day (11 October), brought together data from 2416 studies involving 128.9 million participants worldwide including 31.5 million children and adolescents aged 5-19 years, to estimate trends in body mass index (BMI) in 200 countries

Excessive weight gain in childhood and adolescence is associated with a higher risk and earlier onset of chronic diseases such as type 2 diabetes, worse psychosocial and educational outcomes, and lifelong harms since weight loss is hard to achieve.

Average child and adolescent BMI remains high in many high-income countries in North America and Europe but trends have plateaued in recent years, even while average BMI among adults continues to rise. By contrast, the rise in average BMI has accelerated in many parts of Asia.

In addition to the 124 million children and adolescents classified as obese in 2016, 213 million children and adolescents were in the overweight range.

"Rates of child and adolescent obesity have increased significantly over the past four decades in most countries in the world," says study author Dr James Bentham, University of Kent, UK. "While average BMI among children and adolescents has recently plateaued in Europe and North America, this is not an excuse for complacency as more than 1 in 5 young people in the USA and 1 in 10 in the UK are obese. Additionally, rates of child and adolescent obesity are accelerating in east, south and southeast Asia, and continue to increase in other low and middle-income regions."

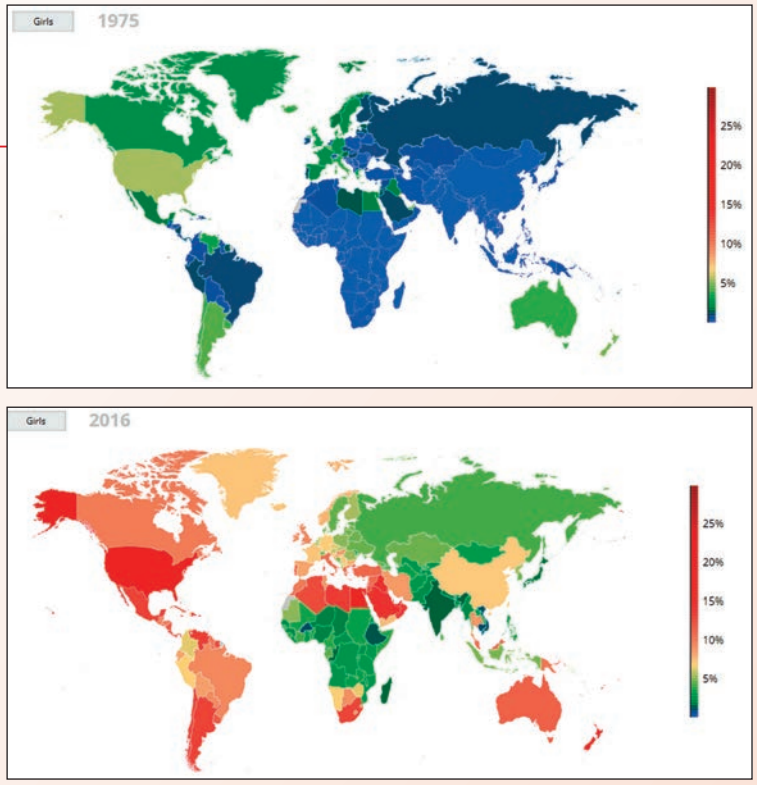
Unaffordability of healthy food options

Professor Majid Ezzati, study author from Imperial College London, adds: "While there have been some initiatives led by governments, communities or schools to increase awareness about childhood and adolescent obesity, most high-income countries have been reluctant to use taxes and industry regulations to change eating and drinking behaviours to tackle child obesity. Most importantly, very few policies and programmes attempt to make healthy foods such as whole grains and fresh fruits and vegetables affordable to poor families. Unaffordability of healthy food options to the poor can lead to social inequalities in obesity, and limit how much we can reduce its burden."

The authors also note that policies to prevent child obesity in entire countries and communities need to be matched by improved treatments, such as behavioural therapy to change diet and exercise, screening and management of hypertension and liver problems, and in extreme cases, bariatric surgery.

Leanne Riley, study author from WHO, says: "The trends show that without serious, concerted action to address obesity, from improving diets and providing the means by

World Health Federation



The world maps show the increase in the number of girls (ages 5-19 years) with obesity from 1975-2016. Obesity refers to BMI > 2SD from the median of the WHO growth reference.

which to increase physical activity, to implementing the health system measures required to address overweight and obesity in young people early on, then the health of millions of people will be needlessly placed in great jeopardy, leading to immense human and economic costs to communities."

At the other extreme, in 2016 average BMI was lowest for both girls and boys in Ethiopia (16.8 kg/sq m for girls, 15.5 kg/sq m for boys), and was also low in Niger, Senegal, India, Bangladesh, Myanmar, and Cambodia. Underweight among children and adolescents is associated with higher risk of infectious disease, and for girls of childbearing age, is associated with adverse pregnancy outcomes including maternal mortality, delivery complications, preterm birth and slow intrauterine growth. In south Asia, 20.3% of girls and 28.6% of boys were moderately or severely underweight in 2016 (compared to 23.0% and 37.8% in 1975).

"There is a continued need for policies that enhance food security in low-income countries and households, especially in south Asia. But, our data also show that the transition from underweight to overweight and obesity can happen quickly in an unhealthy nutritional transition, with an increase in nutrient-poor, energy-dense foods. Our findings highlight the disconnect between the global dialogue on overweight and obesity, which has largely overlooked the remaining under-nutrition burden, and the initiatives and donors focusing on under-nutrition that have paid little attention to the looming burden of overweight and obesity," Professor Ezzati adds.

Between 1975 and 2016, the prevalence of moderate and severe underweight decreased from 9.2% to 8.4% in 2016 for girls, and from 14.8% to 12.4% for boys, meaning that the rate of increase in the prevalence of obesity in children and adolescents is greater than the rate of decline in under-nutrition. The authors say that if post-2000 trends continue, child and adolescent obesity is expected to surpass moderate and severe underweight by 2022.

While the study used an unprecedented number of data sources from most of the world's countries, some regions (the Caribbean, Polynesia and Micronesia, central Asia and central Africa) had fewer data sources, meaning that there is more uncertainty in their estimates.

• **doi:** 10.1016/S0140-6736(17)32129-3 MEH

World Obesity Federation confirms "obesity is a chronic relapsing disease"

In a statement published recently in the journal *Obesity Reviews*, the World Obesity Federation confirms its support for defining obesity as a chronic, relapsing disease. The statement was prepared by a scientific committee of the Federation which concluded that obesity fits the epidemiological model of a disease process except that the toxic or pathological agent is diet-related rather than a microbe.

The World Obesity Federation is an alliance of over 50 national and regional organisations dedicated to research into obesity, and treatment and prevention of the disease.

The question of whether obesity should be called a 'disease' has sparked controversy for most of the last century. In their *Obesity Reviews* position statement, Dr George Bray, Pennington Biomedical Research Center of Louisiana State University, Baton Rouge, Louisiana, USA, and his colleagues examine how an abundance of food, low physical activity, and several other environmental factors interact with genetic susceptibility. They draw parallels to chronic diseases, noting that the magnitude of obesity and its adverse effects in individuals may relate to the virulence or toxicity of the environment and its interaction with the host.

"Accepting the concept that obesity is a chronic disease process is important for several reasons," said Dr Bray. "First, it removes the feeling that patients alone are responsible for their excess weight. It also focuses attention on the ways in which this disease process can be tackled. And finally, it shows that if we can successfully treat obesity, many of its associated diseases will be eliminated."

In an accompanying letter to the editor, the Federation's policy experts suggest that declaring obesity to be a disease could benefit those people who are suffering with obesity and wish to have access to medical advice and support, "whilst also strengthening the call for dealing with the social determinants, obesogenic environments and systemic causes of individual weight gain". They note that obesity is a normal response to an obesogenic environment, but is not in itself a biologically normal or healthy condition. They also note that recognizing obesity as a disease may reduce individuals' internalized stigma, change the public discourse about blame for the condition, and have benefits in countries where health service costs are funded from insurance schemes that limit payments for non-disease conditions or risk factors.

• **doi:** 10.1111/obr.12551

Statins reduce deaths from heart disease by 28% according to 20-year study

Previous research has shown the benefit of statins for reducing high cholesterol and coronary heart disease risk amongst different patient populations. However, until now there has been no conclusive evidence from trials for current guidelines on statin usage for people with very high levels of low density lipoprotein (LDL) cholesterol (above 190mg/dL) and no established heart disease.

A recent study published in *Circulation* focused on men with high levels of 'bad' cholesterol and no other risk factors or signs of heart disease.

After studying mortality over a 20-year period, researchers led by Professor Kausik Ray at Imperial in collaboration with the University of Glasgow showed that 40mg daily of pravastatin, a relatively weak type of statin, reduced deaths from heart disease in participants by more than a quarter.

Senior author Professor Ray from Imperial's School of Public Health said: "For the first time, we show that statins reduce the risk of death in this specific group of people who appear largely healthy except for very high LDL levels. This legitimises current guidelines which recommend treating this population with statins."

In addition, the findings challenge current approaches on treating younger patients with LDL elevations with a 'watch and wait' approach. Instead, the authors say even those with slightly elevated cholesterol are at higher long-term risk of heart disease, and that the accumulation of modest LDL reductions over time will translate into large mortality benefits.

Professor Ray added: "Our findings provide the first trial-based evidence to support the guidelines for treating patients with LDL above 190mg/dL and no signs of heart disease. They also suggest that we should consider prescribing statins more readily for those with elevated cholesterol levels above 155 mg/dl and who also appear otherwise healthy."

The West of Scotland Coronary Prevention Study

The paper is published in the journal *Circulation*. It follows a five-year 1995 study in which researchers observed the long-term effects of statins on patients involved in the West of Scotland Coronary Prevention Study (WOSCOPS) trial. The researchers took into account the original five-year study and followed the patients for a further 15 years.

The WOSCOPS study provided the first conclusive evidence that treating high LDL in men with pravastatin for five years significantly reduces the risk of heart attack or death from heart disease compared with placebo. Statins were subsequently established as the standard treatment for primary prevention in people with elevated cholesterol levels.

Now, researchers have completed analyses of the 15-year follow up of 5,529 men, including 2,560 with LDL cholesterol above 190 mg/dL of the original 6,595, chosen because they had no evidence of heart disease at the beginning of the present study.

Participants were aged 45-64 years. During the five-year initial trial they were given pravastatin or placebo. Once the trial ended the participants returned to their primary care physicians, and an additional 15-year period of follow-up ensued.

The 5,529 men were split into two groups: those with 'elevated' LDL (between 155 and 190mg/dL) and those with 'very high' LDL (above 190mg/dL). The standard 'ideal' level of LDL for high risk patients is below 100mg/dL, but this varies depending on individual risk factors.

The researchers found that giving pravastatin to men with 'very high' LDL reduced 20-year mortality rates by 18%. Statins also reduced the overall risk of death by coronary heart disease by 28%, and reduced the risk of death by other cardiovascular disease by 25% among those with very high LDL cholesterol.

The 15-year follow up also meant the researchers could compare patients' original predicted risk of heart disease with actual observed risk. According to the risk equations for cardiovascular disease, 67% of patients included in the WOSCOPS trial with LDL above 190mg/dL would have less than a 7.5% risk of heart disease by year ten, and thus would not have been treated with statins based on that risk.

However, the present study shows that in fact, this group actually had a 7.5% risk by year five, meaning their 10-year risk was 15%. Following statin therapy, this group's 10-year risk was reduced compared with those that were given placebo during the trial.

Standing by statins

The authors say the findings provide the first direct randomised trial evidence to confirm that current guidelines should stand as they are for those with very high LDL, and those with LDL levels above the 190mg/dL threshold should be considered for statin therapy without risk assessment, as the LDL elevation provides enough risk on its own.

Professor Ray said: "This is the strongest evidence yet that statins reduce the risk of heart disease and death in men with high LDL. Our study lends support to LDL's status as a major driver of heart disease risk, and suggests that even modest LDL reductions might offer significant mortality benefits in the long-term. The analysis firmly establishes that controlling LDL over time translates to fewer deaths in this population."

• **doi:** 10.1161/CIRCULATIONAHA.117.027966 MEH

Note

This study was partly funded by a grant from Sanofi to Imperial College London. The WOSCOPS trial was originally funded by Bristol-Myers Squibb and Sankyo. Funding organizations had no influence on the design and conduct of the study; collection, management, analyses, and interpretation of the data; preparation, review or approval of the manuscript; or the decision to submit the manuscript for publication.

Misdiagnosis of diabetes type renders treatment inefficient

By **Dr Sara Suliman**
Consultant Endocrinologist and Diabetologist at Imperial College London Diabetes Centre (ICLDC)

Diabetes mellitus is one of the major healthcare challenges in the UAE with close to one in five adults currently affected. It places a substantial burden on society not only due to the material costs of treatment of diabetes and its associated complications (most notably cardiovascular disease), but also due to reduced productivity, chronic disability and premature mortality. Other intangible costs include: reduced quality of life, pain and suffering of people living with diabetes, as well as the physical, psychological and material strains on family and friends of affected individuals e.g. the parents of a child with diabetes.

Precision medicine (or personalised medicine) is an emerging approach to disease diagnosis, treatment and prevention that considers variations in genes (genomics), proteins (proteomics), metabolites (metabolomics), environment, lifestyle and other factors (e.g. gut micro-biome). This approach helps to properly classify diseases such as diabetes offering individualised treatment and moving away from the 'one size fits all' model. Diabetes is a prime example of a condition where many patients and their physicians are aware of two sub-types (type-1 or type-2), whereas in practice there are in excess of 15 sub-types of diabetes each of which has a different aetiology and as such could and should be treated differently.

The majority (95-98%) of those living with diabetes worldwide have either type-1 or type-2 diabetes. However, in an estimated 2-5% of diabetic patients (i.e. approximately 20,000 – 50,000 individuals in the UAE), a genetic abnormality (often due to a single gene defect) causes abnormalities in insulin secretion or action that can lead to diabetes. This condition is called monogenic diabetes and is diagnosed based on certain criteria, and more specifically, genetic testing. Importantly, many of these conditions are familial affecting 50% of an affected individuals off-spring.

The benefits of genetic testing in diabetes management

Individuals with monogenic diabetes are often misdiagnosed with either type 1 or 2 diabetes, and as such often treated inappropriately. Genetic testing can have immense benefits in diabetes management, as the correct diagnosis allows some patients to transfer from insulin injections to oral medication with marked improvements in glycaemic control and, in turn, quality of life. It may also identify families with diabetes and high cardiovascular risk e.g. familial partial lipodystrophy who require vigilance in investigation and early management, whereas on the other end of the spectrum diabetic families with glucokinase mutations have a very low risk of diabetes-related complications similar to non-diabetic populations.

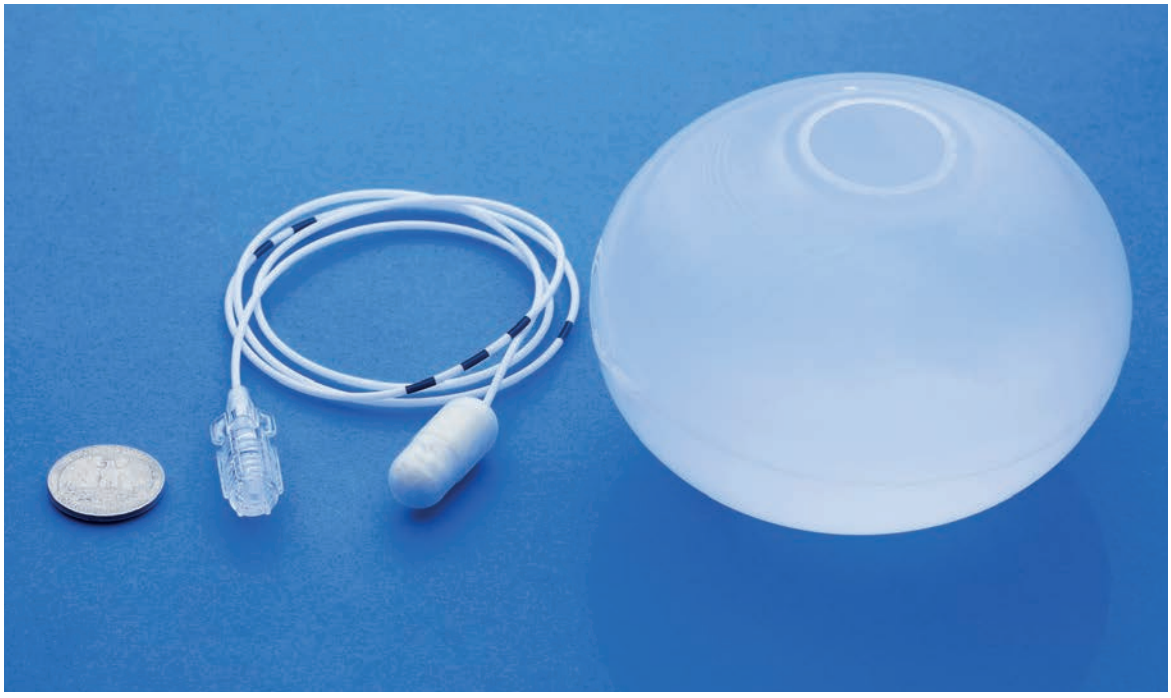
Monogenic diabetes remains largely under-diagnosed and under-researched. With strong indications pointing to previously undiscovered mutations, perhaps specific to the UAE and the wider Middle East, in some patients.

Imperial College London Diabetes Centre (ICLDC) opened the first dedicated genetics of diabetes and endocrine disorders clinic in the GCC region in March 2016. Currently serving 165 individuals with diverse types of monogenic diabetes and genetic endocrine disorders, the facility sees on average three to four new cases every week. This offers a personalised service focusing on accurate diagnosis using genetic testing, and tailors investigations and treatment accordingly. In 2016, six patients could come off insulin after their diabetes was diagnosed as monogenic and not type 1 as originally believed.

The prevalence of monogenic diabetes in the UAE is currently unknown. ICLDC's Genetics Clinic is setting the benchmark for monogenic diabetes clinical care and research in the region with its ground-breaking work. The team is expanding to include a genetic counsellor and dedicated diabetes genetics nurses to enable the facility to treat more people, identify affected family members as well as raise awareness of monogenic diabetes and its risks among the community. Data collected at the clinic will provide an ideal base for establishing a national and regional registry of monogenic diabetes that is set to become an invaluable resource for research of the condition and the most effective treatments locally and regionally. MEH

Imperial College London Diabetes Centre's Genetics Clinic operates out of the Centre's Khaleej Al Arabi Branch in Abu Dhabi under the leadership of Dr Sara Suliman, Consultant Endocrinologist and Diabetologist. The facility performs genetic testing in collaboration with world-renowned experts in monogenic diabetes from the Clinical Genetics Department at the Royal Devon and Exeter NHS Foundation Trust Hospital in the UK.

- For patient referrals, please contact 024040811 (Mrs Lama Arida) or 024040956 (Mrs Smitha Joseph).



The Elipse Balloon

Use of new swallowable gastric balloon results in substantial weight loss

Research presented at this year's European Congress on Obesity (ECO) in Porto, Portugal (17-20 May) shows that a swallowable gastric balloon – that can be inserted without endoscopy or anaesthesia – is a safe and effective way to induce substantial weight loss.

The study is by Dr Roberta Ienca, Sapienza University of Rome, Italy, and colleagues.

Intragastric balloons (IGBs) have been used as weight loss devices for decades. Their mechanism of action is likely multifactorial, but they appear to make it easier to adhere to a low-calorie diet by inducing feelings of satiety. However, all IGBs have historically required endoscopy and sedation resulting in a low adoption rate and high cost.

In this new study, the authors evaluated the efficacy and safety of a new swallowable IGB (Elipse™ Balloon, Allurion Technologies, MA, USA), not needing endoscopy or anaesthesia, optimised to reduce risk and discomfort, in combination with a very low-calorie ketogenic diet (low calorie and low carbohydrate) (VLCKD) in the final month of therapy. The researchers did a prospective, non-randomised study in 50 obese individuals (BMI 30-45 kg/m2) who had failed to lose weight by diet alone and who had refused other IGB treatment, because of the need of an endoscopy and/or anesthesia, and had been offered the Elipse Balloon.

The balloon was swallowed under fluoroscopy and then filled with 550mL of liquid. The balloon remains in the stomach for 16 weeks after which it spontaneously opens, empties, and is excreted. Follow-up was performed every 2 weeks. In the last 4 weeks of treatment, a ketogenic diet (~700 kcal/day) was introduced to enhance weight loss and maximise the results to increase patient satisfaction. Once the balloon was excreted, patients were transitioned to a Mediterranean diet for weight maintenance.

A total of 42 patients (29 men and 13 women) patients were enrolled. Eight of the original 50 patients were contraindicated for balloon implantation for various reasons.

Mean age was 46 years, mean initial weight was 110 kg, and mean initial BMI was 39 kg/m2. After 16 weeks, the mean weight loss was 15.2 kg, mean % excess weight loss was 31%, and mean BMI reduction was 4.9 kg/m2. At 4, 8 and 12 weeks a mean weight loss of 5.4 kg, 8.9 kg and 11.5 kg was observed, respectively. In the VLCKD period (the final four weeks), a mean weight loss of 3.7 kg, was observed, similar to that seen between weeks 4 and 8.

There were no serious adverse events recorded. All other adverse events including nausea, vomiting, and abdominal pain were either self-limiting or resolved with medication. Significant reductions were also

Imperial College London Diabetes Centre is a global leader in diabetic treatment, education and research

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observed in comorbidities such as diabetes, high blood pressure, high cholesterol, and metabolic syndrome.

Dr Ienca concludes: "The Elipse Balloon appears to be a safe and effective weight loss method. Furthermore, the introduction of a VLCKD improves weight loss. Because the Elipse Balloon does not require endoscopy, surgery or anaesthesia, this may make it suitable for a larger population of obese patients not responding to diet/lifestyle treatment; and also for use by a variety of clinicians – nutritionists, dietitians, and internists – who currently do not have access to or are qualified to fit endoscopic or surgical weight loss devices. Furthermore, the absence of endoscopy and anaesthesia for placement and removal can lead to significant cost savings."

The Elipse Balloon is approved for commercial use in Europe and parts of the Middle East.

There are some conditions that would make a person unsuitable for treatment with this IGB. These include those with dysphagia (difficulty swallowing) or other swallowing disorders may be unsuitable for a swallowable balloon. In addition, individuals with a history of bowel obstruction or other disorders of the gastrointestinal tract may also be unsuitable for a balloon that passes and is excreted. MEH

Metabolically healthy obese individuals remain at risk of coronary heart disease

New research presented at this year's European Congress on Obesity (ECO) in Porto, Portugal earlier this year shows that so called 'metabolically healthy' obese people are still at higher risk of cardiovascular disease events such as heart failure or stroke than normal weight people.

The study is by Dr Rishi Caleyachetty and colleagues at The Institute of Applied Health Research, College of Medical and Dental Sciences, University of Birmingham, UK.

People with metabolically healthy obesity (MHO) are clinically obese in terms of their body mass index (BMI) (more than 30 kg/m2), but do not have metabolic complications that usually come with obesity, such as abnormal blood fats, poor blood sugar control or diabetes, and high blood pressure. Whether MHO is associated with excess risk of cardiovascular disease (CVD) events is a subject of debate. Important limitations in the evidence to date include inconsistent definitions of metabolic health, inconsistent control for other factors (confounders), and small sample sizes. In this new study, the authors address these limitations in a large contemporary cohort, based on linked primary care electronic health records.

The researchers used linked electronic health records from 1995 to 2015 in The Health Improvement Network (THIN) — a large UK database of general practice records — to assemble a cohort of 3.5 million individuals aged 18 years or older and initially free from CVD. To determine metabolic health, they divided the population into groups according to BMI and the presence or absence of 3 metabolic abnormalities (diabetes, hypertension, and hyperlipidemia) which were added together to create a metabolic abnormalities score (0, 1, 2 and 3). To be classified as MHO, individuals had to have none of these metabolic abnormalities.

The study examined whether the risk of developing four cardiovascular conditions [coronary heart disease (CHD), cerebrovascular disease (transient ischaemic attack or stroke), heart failure, and peripheral vascular disease (PVD)] was different for normal weight people with no metabolic conditions or people with MHO.

The authors found that, compared to normal weight individuals with no metabolic abnormalities, individuals with MHO had a 50% increased risk of CHD; a 7% increased risk of cerebrovascular disease and a doubled risk of heart failure, (all statistically significant), after taking into account demographics and smoking behaviour. Against these trends, MHO individuals had a 9% lower risk of PVD. However, in further analyses that excluded cigarette smokers, individuals with MHO had a significantly (11%) increased risk of developing PVD compared with those with normal weight and zero metabolic abnormalities.

Analysis

The analysis also showed that the risk of CVD events in obese individuals increased with increased number of metabolic abnormalities present. For example, compared to a normal weight person with zero metabolic abnormalities, an obese person with 3 metabolic abnormalities had a 2.6 times increased risk of CHD; a 58% increased risk cerebrovascular disease including stroke; a 3.8 times increased risk of heart failure, and a 2.2 times increased risk of PVD.

Dr Caleyachetty says: "This is the largest prospective study of the association between metabolically health obesity and cardiovascular disease events. Metabolically healthy obese individuals are at higher risk of coronary heart disease, cerebrovascular disease and heart failure than normal weight metabolically healthy individuals. The priority of health professionals should be to promote and facilitate weight loss among obese persons, regardless of the presence or absence of metabolic abnormalities."

He adds: "At the population-level, so-called metabolically healthy obesity is not a harmless condition and perhaps it is better not to use this term to describe an obese person, regardless of how many metabolic complications they have." MEH

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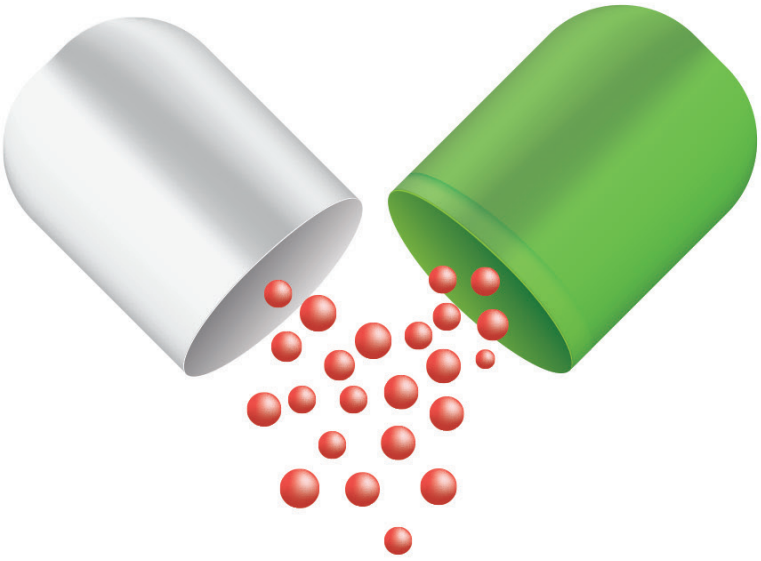

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Large studies find screening reduces mortality for those with detectable type 2 diabetes but not for general population

Three large trials published today in *Diabetologia* (the journal of the European Association for the Study of Diabetes) show that screening for type 2 diabetes and cardiovascular risk factors may not reduce mortality and cardiovascular disease in the general population. However, for individuals diagnosed with diabetes, screening is associated with a reduction in mortality and cardiovascular disease risk.

Health checks including diabetes risk assessment have been introduced in a number of countries. However, there are few population-based trials assessing the benefits and harms of these screening programmes, and these have shown mixed results. The first two studies, both led by Dr Rebecca Simmons of the Department of Public Health, Aarhus University, Denmark, and the MRC Epidemiology Unit, University of Cambridge, UK, used data from ADDITION-Denmark, part of the Anglo-Danish-Dutch Study of Intensive Treatment in People with Screen-Detected Diabetes In Primary Care.

Between 2001 and 2006, a population-based cardiovascular and diabetes screening programme was introduced in five out of sixteen Danish counties. Over 150,000 individuals registered with 181 practices participating in the ADDITION-Denmark study were sent a diabetes risk score questionnaire, and if their score indicated moderate to high risk they were invited to attend for a diabetes test and cardiovascular risk assessment with their family doctor.

More than 27,000 attended for screening, and 1533 were diagnosed with diabetes during screening. A further 1,760,000 individuals were identified for a matched no-screening control group. Participants were followed for approximately 9.5 years to 31 December 2012, when national registers were searched for vital status and cardiovascular disease (CVD) events – CVD death, non-fatal ischaemic heart disease and non-fatal stroke.

The researchers found that in the overall populations in the screening and no-screening groups, a single round of screening for type 2 diabetes and cardiovascular risk assessment was not associated with a reduction in mortality or in cardiovascular events between 2001 and 2012. Similarly, rates of cardiovascular, cancer or diabetes-related mortality were not reduced by invitation to screening.

However, the sister study, which focused on those who were diagnosed with type 2 diabetes – either at the time of screening (2001–2006) or subsequently (2007–2009) – yielded different results. Individuals with clinically-diagnosed diabetes were identified on average 2.2 years later than individuals whose diabetes was detected in the screening practices. A single round of diabetes screening and cardiovascular risk assessment was associated with a 21% reduction in all-cause mortality rate and a 16% reduction in CVD events between 2001 and 2012 in individuals diagnosed with diabetes between 2001 and 2009.

The authors note that as only 10% of individuals with diabetes in the screening group were actually diagnosed by screening, it is likely that the programme had wider effects in this cohort. For example, general practitioners in the screening group may have provided lifestyle advice and delayed development of diabetes among those found to be at risk. They may also have increased vigilance and the likelihood of early detection even after screening. Healthy behaviour change might also have impacted the findings – for example one third of screen-detected individuals reported that they had stopped smoking at five-year follow up, and this cohort lost an average of 2 kg in weight.

The authors suggest that benefits to the general population might be increased by identification of non-attenders, targeting of screening to those at greatest risk, strategies to maximise uptake of screening, use of repeated rounds of screening, and optimal treatment of detected disease.

In the third article published on this subject, researchers identified 1024 screen-detected and 8642 clinically-detected cases of type 2 diabetes in a population of over 140,000 individuals eligible for screening at 10-year intervals (at age 30, 40, 50 and 60 years) between 1992 and 2013. Screening was undertaken as part of the Västerbotten Intervention Programme (VIP), a large community- and individual-based intervention in Västerbotten County, Sweden. Screen- and clinically-detected diabetes cases were followed up in national registries for mortality, CVD events, renal disease and retinopathy for on average 8.7 and 7.2 years after diagnosis, respectively.

The authors, led by Dr Adina Feldman and Professor Olov Rolandsson from the VIPCAM collaboration between the University of Cambridge, UK, and Umeå University, Sweden, say: "We found that individuals with screen-detected diabetes were diagnosed on average 4.6 years earlier than those who were clinically-detected, and that when followed up after their diagnosis, they had markedly lower rates of all-cause mortality, CVD, renal disease and retinopathy. Although we cannot fully

disentangle the contribution of length time bias in particular, these data suggest a positive effect on survival and health outcomes if diabetes is detected earlier through screening than it would have been in clinical practice."

Taking these results together, Dr Simmons says: "Screening appears to offer beneficial effects for all those diagnosed with diabetes, regardless of whether they were screen detected or clinically diagnosed but this benefit is too small to have an impact on overall population risk of heart disease and stroke, for example, or on early death."

Indeed, in the first of two comments published with these articles, Professor David Simmons, Western Sydney University, NSW, Australia, and Dr Janice C. Zgibor, University of South Florida, Tampa, FL, USA, say that "trials of screening for undiagnosed diabetes among asymptomatic individuals may no longer be feasible or ethical in many countries. The most efficient recommendation may be opportunistic screening, where patients already seeking care (including screening) for another condition are subsequently tested for diabetes or prediabetes. If screened positive, they are more likely to receive treatment, thus leading to improved outcomes. There is probably sufficient evidence to conclude that this systematic approach to screening should occur in primary care and that focus should now shift to trials of how to screen, methods for implementing treatment earlier, and better risk factor control in those at highest risk."

Professor Jonathan Shaw, Baker Heart and Diabetes Institute, Melbourne, VIC, Australia, says: "The appropriate conclusion from the currently-available evidence is that community screening programmes cannot be justified for type 2 diabetes in countries where opportunistic diabetes screening is functioning well, and management of cardiovascular risk factors is good. The large amounts of public money required for such screening programmes would be better spent on treating those with clinically diagnosed disease." MEH

Lower socioeconomic status linked to obesity through distress and emotional eating

New research presented at this year's European Congress on Obesity in Porto, Portugal shows that lower socioeconomic status is associated with higher body-mass index (BMI) through its effects on distress and subsequent emotional eating.

The study is by Jade Stewart and Dr Charlotte Hardman, Department of Psychological Sciences, University of Liverpool, UK and colleagues.

Lower socioeconomic status is robustly associated with obesity; however, the underpinning psychological mechanisms remain unclear. According to a recent theoretical model*, socioeconomic disadvantage increases psychological distress which, in turn, promotes maladaptive coping behaviours, such as emotional eating, and ultimately obesity. Furthermore, resilience (an individual's capacity to cope with stressors and 'bounce back') is thought to moderate the association between socio-economic disadvantage and distress thus providing a protective role. The current study sought to test these predictions.

A total of 150 adults aged 18 to 65 years and from a range of socioeconomic backgrounds reported their income and education level as an indicator of socioeconomic status. Psychological distress, emotional eating, and resilience were assessed using the Depression, Anxiety and Stress Scale, the Dutch Eating Behaviour Questionnaire, and the Brief Resilience Scale, respectively. Self-reported height and weight were also obtained to calculate body mass index (BMI).

As predicted, the data (adjusted for age and sex) indicated a significant indirect effect of socioeconomic status on BMI via psychological distress and increased emotional eating; specifically, lower socioeconomic status was associated with higher distress, higher distress was associated with higher emotional eating, and higher emotional eating was associated with higher BMI. An increase by 1 scale point on the emotional eating scale (scale 1-5) was associated with an increase in BMI of 1.9 kg/m2. Mean BMI at the lowest point on the emotional eating scale was 23.3 kg/m2. At the highest point it was 30.9 kg/m2. However, contrary to prediction, resilience was not found to moderate this effect.

The authors conclude: "These findings provide a novel insight into the relationship between socioeconomic status and obesity, suggesting that it may be partly explained by psychological distress and subsequent emotional eating as a coping strategy. Targeting these maladaptive coping behaviours in response to distress may be a way of reducing obesity in low-income populations."

They add: "One way of doing this would be to teach people to implement more positive coping strategies when they are in a state of distress for example going for a walk instead of eating chocolate."

"The association between low SES and access to cheap energy-dense foods and subsequent obesity is already well-documented. What this study does is to shed light on a psychological explanation for the association between SES and obesity and this has received little consideration in research to date."

Reference:

*Hemmingsson, E. (2014). A new model of the role of psychological and emotional distress in promoting obesity: conceptual review with implications for treatment and prevention. Obesity Reviews, 16, 769 -779. MEH

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NHS transforming healthcare – the journey continues

By **Kevin Kiely**
Founder & CEO Medilink North of England
International Executive, Medilink UK

The National Health Service in England which was launched in 1948, now services nearly 1 million patients per day 'from cradle to grave' free at the point of care, and it is recognized by many to be one of the most efficient healthcare delivery systems in the world. However, the challenges of increasing demand and the need to contain costs, requires innovative ways of thinking and new structures. Central to NHS England's transformation plan, contained in the NHS England's 'Five Year Forward View', is the development and testing of New Models of Care.

The first initiative under this plan was the selection of 50 vanguard sites to take a lead on the development of new care models across, 'acute care collaborations'; 'urgent and emergency care'; 'integrated primary and secondary care' and; 'multispecialty community providers'.

Many sites focused on care being integrated more effectively around the needs of populations and patients, and a high priority for all the sites, was to strengthen links between general practices and other health and care services. After two years of operation, progress has been faster in some sites rather than others, but there is a common recognition of the need to do things differently, and a palpable enthusiasm to make changes.

Test Beds

In 2016, seven Test Beds were established as 'real-word' trials for testing 'combinatorial' innovation (new combinations of products and processes) to improve patient outcomes, within current cost constraints. Rather than developing products in isolation of changing patient pathways, this programme was intended to demonstrate that the NHS could work with industry to create cutting-edge digital solutions to support service transformation.

The Test Beds programme was unprecedented in scale, with 40 innovators, 51 digital products, eight evaluation teams and five voluntary sector organisations involved. The programme is still in its testing phase, working with 51 innovations across redesigned pathways and engaging over 4,000 people. When the testing is concluded in the summer of 2018 it is anticipated that 15,000 people will have been engaged in the programme.

An important 'bottom up' approach to driving healthcare transformation, has been the development of 'sustainability and transformation plans (STPs)' by health and social care leaders, to reflect the needs of specific geographical regions. The plans developed in 44 regions (submitted in October 2016) were required to cover three broad themes: improving quality and developing new models of care; improving health and wellbeing and; improving efficiency of services.

It is widely believed that this approach is the only practical way to bring about sustainable change, and a recent report on four STPs, provided recommendations for refinement in the future, including securing more meaningful involvement of patients and the public in the plans, and focusing on the skills and resources needed to implement STPs, as well as the cultural aspects of making change happen.

Global Digital Exemplars

In order to fast track digital maturity in the NHS (or bringing it into the 21st Century), 16 digitally advanced acute trusts are being supported by NHS England, through funding and international partnerships, to become Global Digital Exemplar sites. Each Global Digital Exemplar has selected one (or occasionally two) trusts to partner with to accelerate their digital maturity. In some cases, this will be sharing software

or a common IT team. Others will adopt standard methodologies and processes. 'Fast followers' will enable Global Digital Exemplars to establish proven models that can be rolled out across the NHS more broadly.

NHS England, like many other healthcare delivery systems have been wrestling with the challenge of how to ensure that patients benefit from technology advances at the earliest opportunity. The publication of the '*Accelerated Access Review*' Report late in 2016 after an extensive consultation period engaging all major stakeholders including industry, provided fresh momentum to responding to this challenge. Included in its recommendations were:

i) A new transformative designation should be applied to those innovations with the potential for greatest impact

ii) Accelerated Access Pathway should be created for strategically important, transformative products

iii) National routes to market should be streamlined and clarified

iv) a range of incentives should support the local uptake and spread of innovation, enabling collaboration and with greater capacity and capability for change.

Innovation and Technology Tariff

Early in 2017, The Innovation and Technology Tariff (ITT) was introduced to incentivise the adoption and spread of transformational innovation in the NHS. The themes for the ITT were sought in conjunction with NHS Innovation Accelerator programme, with the key themes being funded under a simple zero cost model, whereby providers order the innovations from the supplier at no cost and NHS England reimburses the supplier directly. The Innovation and Technology Payment (ITP) was subsequently launched in the summer of 2017, which aims to support the NHS in adopting innovation by removing financial or procurement barriers to uptake of innovative products or technologies.

Turning to support for companies developing new innovative products, since 2008 the NHS has backed a Small Business Research & Innovation programme (SBRI), which has supported more than

Strengthening ties between the UK and the Middle East

One again, the Association of British Healthcare Industries (ABHI) are delighted to be the official organiser of the UK pavilion at Arab Health 2018. As the UK's leading Medical Technology trade association, we are well positioned to showcase the best in cutting-edge MedTech innovation that our country has to offer. With 200 UK companies exhibiting at Arab Health in January, we are excited with the sheer breadth and diversity of the technologies on display. It is a wonderful expression of what our industry has to offer in providing value-based healthcare solutions for patients across the globe.

As most will be aware, the UK is experiencing unprecedented change as it navigates its exit from the European Union. Yet despite this, the MedTech sector remains undeterred. It continues to grow at both pace and scale, and is now worth over £17 billion to the UK's economy. The industry remains resolute and is actively seeking opportunities post-Brexit.

With Brexit in mind, the UK Government has launched an Industrial Strategy to drive the country forward. As part of this, Life Sciences has repeatedly been highlighted as a key area for future growth, and MedTech identified as a pillar of this strategy.

We believe that trade will be vital in enabling this vision to become a reality.

ABHI International Membership

To support our government's ambitions, ABHI recently became the first UK Life Sciences industry association to create a bespoke membership offering for international companies. We see the launch of the ABHI International Membership category as a direct action on the government's call and we at the association are very excited as to the possibilities.

ABHI has, for a long time, offered UK companies a variety of support and opportunities to export globally. International membership is making these links more accessible for international companies wanting to partner with their British counterparts. We are signposting and introducing international companies to a highly-developed network within the UK health system with a view to supporting the development of joint-ventures and distribution agreements. As well as access to written briefings, webinars and market intelligence reports, membership is underpinned by the collective expertise of ABHI's senior leadership team and the international division of the association. Some companies may even already have activities within the UK, but are looking for that 'next step', which is where we are able to provide the assistance needed. ▶

100 companies to develop innovative technologies that match the specific priority needs identified in competition calls. This provides 100% funding for SME-led collaborations to develop solutions to real needs. A recent independent report commissioned by the NHS has demonstrated significant benefits of the programme not only in respect to improved performance and cost savings, but also in respect to economic impact with regard to increase jobs, export sales and investment leveraged.

Invention for Innovation

A Department of Health scheme, Invention for Innovation (i4i) has also recently introduced a 100% early stage funding competition (i4i Connect) which will allow companies to undertake basic proof of concept work. This is intended to provide a platform for smaller companies to be able to apply for the larger i4i Product Development Scheme. The UK's Innovation Agency, Innovate UK, also have substantial funding available to companies through its Biomedical Catalyst Calls and Health & Life Science calls, which encourage collaboration and provide seamless support through the product development journey to include financial support for patents and clinical trials.

The National Institute of Health Research (NIHR) infrastructure offers significant support for companies that are seeking to undertake clinical trials in the UK, this support spans advice on the use of specialist clinical research networks (e.g. cardiovascular disease), regulation, costing, site identification, recruitment, optimizing delivery, efficient study set up and performance monitoring. This enables companies to fast track clinical study execution.

▶ (continued...)

We are delighted to already have several international members on board. A number of these hail from the Middle East, a region we consider to be very much a priority for our association and our membership. We have been bringing UK companies to Arab Health for a number of years and the show continues to go from strength to strength. No longer can the Middle East be considered an emerging market. It's position as a key global player in the healthcare sphere must be recognised.

With the UK's medical expertise and the rising number of Middle Eastern patients visiting our world-class clinics, we are eager to deepen these relationships further. We believe the UK is a great place for both healthcare and business and as our international membership develops we are looking forward to developing these relationships with the Middle East further.

- For any companies looking to find out more about ABHI International Membership, contact *angela.jeffery@abhi.org.uk*

■ You can visit the **UK Pavilion at Hall 7** during Arab Health 2018. MEH

Patent Box initiative

The UK Government has created a positive environment for life science inward investment into the UK, with the Patent Box initiative which allows companies to pay only 10% corporation tax on profits attributable to qualifying patents with its R&D tax credit scheme. This provides small to medium-sized companies with relief on qualifying R&D expenditure, and through this the initiative provides a major investment in the clinical study infrastructure.

UK Research Councils

An article on transforming healthcare would be incomplete without reference to the underpinning work of the UK Research Councils, which play a major role in contributing nationally and internationally to tackling major societal challenges. The UK Research Councils invest around £3 billion per year in world-leading research, covering all disciplines and sectors. The Medical Research Council has three main aims to:

i) *Prioritise* – addressing the most pressing health challenges worldwide such as infections, brain health and dementia, and regenerating tissue

ii) *Discover* – breaking new scientific ground and setting new paradigms

iii) *Transform* – working in partnership to transform health research and innovation, such as Informatics & Stratified Medicine.

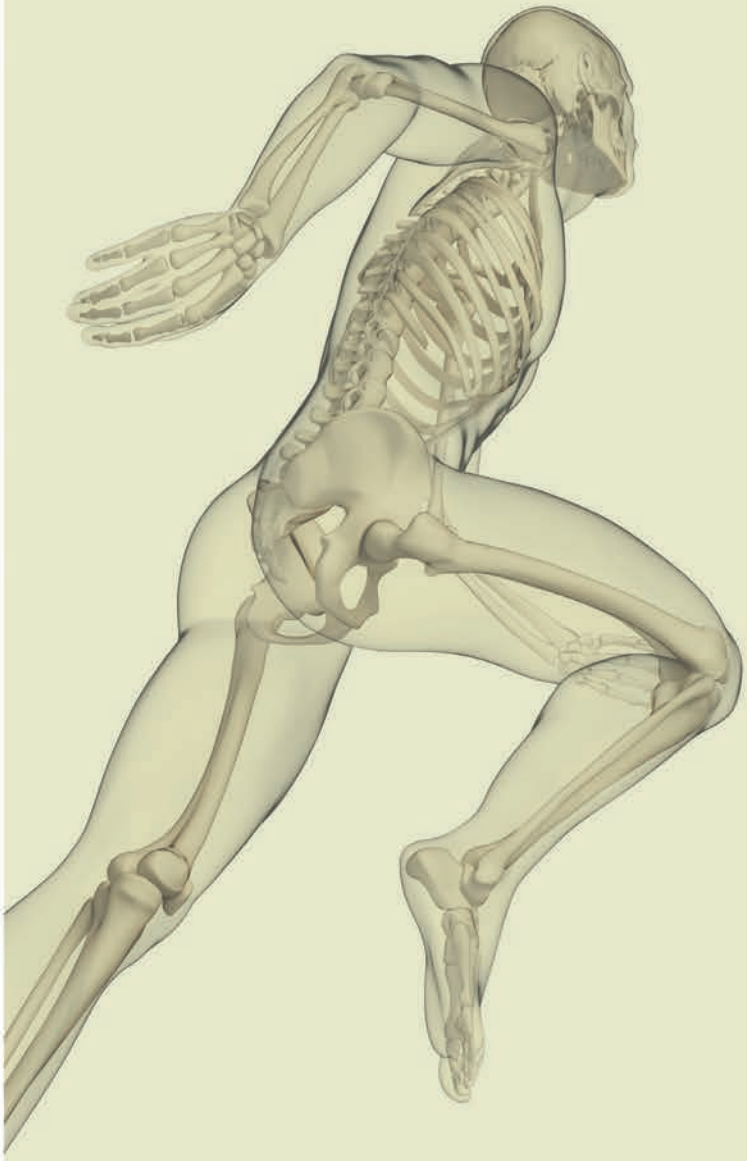
Medilink

Medilink's mantra is 'Transforming Healthcare', and to do this Medilink UK brings together the NHS, Academia and the Life Science industry into a single association, and works with the key UK Government bodies to support integrated healthcare transformation. It also provides specialist consultancy services to UK and overseas companies seeking to fast track product innovation and market adoption. MEH

Private Patient Unit

ROYAL NATIONAL ORTHOPAEDIC HOSPITAL

WORLD LEADERS IN ORTHOPAEDIC CARE



An international reputation for expertise, outstanding models of care and research success

The Royal National Orthopaedic Hospital (RNOH) provides an exclusive range of neuro-musculoskeletal healthcare for both adults and children. Our specialisms include acute spinal injury and complex bone tumours through to orthopaedic surgery and medicine, and specialist rehabilitation for chronic back pain sufferers.

RNOH doctors, nurses and other healthcare staff are all experts in their chosen field. They come from both the UK and across the world, proud to practice their skills surrounded by the very best in their profession and to take part in high-level interdisciplinary research for the benefit of all our patients.

Our highly specialised consultants see patients in the RNOH's state-of-the-art private facilities, which are managed on a day-to-day basis by a dedicated nursing team trained to deliver the very best orthopaedic care.

Every private patient can be confident that they will have access to the most comprehensive range of advanced surgical, medical and diagnostic facilities that are available from a leading specialist NHS hospital.

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website: **www.rnohppu.com**

New surgical approach for total hip replacement allows faster rehabilitation, no muscle damage

By Mr Panos Gikas
Consultant Orthopaedic and Sarcoma Surgeon, Honorary Lecturer, Department of Physics, UCL

Mr Panos Gikas (centre) in theatre.

Recently there has been an increase in interest in performing hip replacement surgery by less invasive means, and by smaller incisions. Some of these so called minimally invasive techniques however are only reduced skin incision techniques and are associated with the same muscle and/or tendon injury as "conventional" approaches.

AMIS® (Anterior Minimally Invasive Surgery) is a surgical technique used in total hip replacement procedures which follows an inter-muscular and inter-nervous plane to reduce the risk of injury to muscles, tendons, vessels and nerves. By respecting the nerves and because no muscles are cut, this aids rapid recovery for patients following surgery.

What are the advantages?

1. **DECREASED POST-OPERATIVE PAIN:** In comparison with "conventional" surgical techniques, the AMIS approach can reduce the post-operative pain as muscles are not cut.
2. **SHORTER REHABILITATION:** Rehabilitation can usually start the day of the operation or the day after. Standing up and walking with arm crutches can start immediately.
3. **SHORTER HOSPITAL STAY:** The AMIS® technique usually significantly reduces the duration of hospital stay.
4. **SMALL SKIN SCAR:** With AMIS®, the skin incision is often shorter than with "conventional" surgery and therefore scar tissue is reduced.
5. **FASTER RETURN TO DAILY ACTIVITIES**
6. **REDUCED RISK OF DISLOCATION:** The preservation of muscles significantly improves the stability of the hip. The risk of dislocation is minimal and the post-operative limitation of movements, usually prescribed in other techniques, is not necessary. The risk of dislocation is reduced because the anterior approach is performed from the front of your body and dislocation is mainly related to posterior hip structure damage.
7. **PREVENTION OF LIMPING:** AMIS® is characterised by a surgical technique that protects the various muscles, blood vessels and nerves encountered during exposure of the hip joint. Minimizing muscle and nerve damage reduces the chances of limping.

What are the disadvantages?

With an incision in the front of the thigh, there can be some alteration in the skin sensation over the front and outer aspect of the thigh. This relates to the anatomy of the small nerves that provide sensation to the skin and their proximity to where the surgical incision is made. Over time the area affected by numbness always reduces significantly.

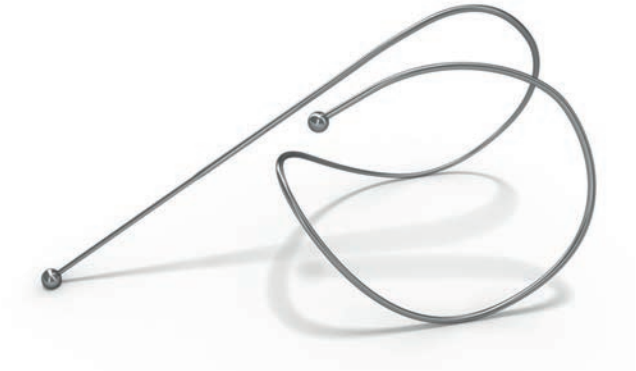
Does it make a difference in the long-term?

The most important factor for the long-term function of a hip replacement is that the hip implants are inserted correctly so as to reconstruct the anatomy of the hip. Beyond the proven early beneficial and faster functional recovery after an anterior approach hip replacement, we do not know if the approach itself makes a significant difference in the longer term.

At the Royal National Orthopaedic Hospital the AMIS Total Hip replacement is being offered by Mr Panos Gikas, who has done a postgraduate fellowship at the University Hospital of Geneva on this approach.

■ For more information contact please contact the Royal National Orthopaedic Hospital Private Patient Unit: 020 8909 5114
ppu@rnohppu.com
www.rnohppu.com MEH

Royal Brompton Hospital



Innovative lung volume coil reduces severe emphysema symptoms

Royal Brompton and Harefield Hospitals Specialist Care provide pioneering diagnostics and treatment to international patients with heart and lung conditions. Many of our consultants are world leaders in their field and offer some of the most sophisticated treatment available anywhere across the globe.

Early this year a new innovative service was launched at the Royal Brompton and Harefield Hospitals in London, UK to treat severe emphysema patients. Lung volume reduction coils are implanted into the diseased parts of the patient's lung during a minimally invasive bronchoscopy procedure, typically taking only 30-45 minutes per procedure. Treatment involves two separate procedures, for each lung, 4-6 weeks apart. This treatment helps to reduce hyperinflation in severe emphysema patients, resulting in a reduction in difficult or laboured breathing.

The PneumRx® Coils are made of a shape-memory material called Nitinol, common in medical implants such as heart stents. The PneumRx® coils are implanted into the airways via a catheter, and once in place are designed to gently regain their shape, gathering up loose, inelastic lung tissue and holding open surrounding airways. Ten or more coils are placed at each procedure to tighten the entire airway network and achieve the optimal effects.

The coils improve lung function in three ways. Firstly, they compress diseased tissue, which provides room for healthier tissue to function; secondly, they re-tension adjacent parenchyma, helping to increase the lung's elasticity, which may enable the lung to more efficiently contract during the breathing cycle; finally, the coil tethers open small airways, preventing airway collapse during exhalation.

Dr Samuel Kemp, Royal Brompton Hospital respiratory physician who performs the treatment says: "Patients with emphysema often have disabling breathlessness which does not respond significantly to drug therapy. Lung volume reduction coil treatment can offer relief from some of these symptoms, giving patients an improvement in quality of life."

Following the procedure a patient can typically return home after just one night in the hospital and see results almost immediately. Patients treated with coils may experience significant improvement in exercise capacity, lung function and quality of life.

■ To refer a patient email: *privatepatients@rbht.nhs.uk* MEH

Graham Elliot (right) is interviewed on Fox Network about his remarkable weightloss.

Celebrity chef reshapes his connection with food and health

More than one-third of Graham Elliot – renowned in the United States as a chef and judge on the Fox Network's popular competitive-cooking show, "MasterChef" – has gone missing.

People become chefs because they appreciate food. Elliot's appreciation, and his waistline, kept pace with his culinary reputation. He joked that "no one trusts a skinny chef". By 2013, however, his trustworthiness had grown a little too apparent. No one would accuse him of skinniness. He weighed almost 400 pounds (181kg).

The weight brought health problems. He had inherited a family history of heart attacks and strokes. The excess weight piled on new issues.

"We had exhausted all options."

"I was suffering from hypertension, sleep apnea, gout, constant aches and pains," Elliot said. "I was physically unable to do things a father, husband and parent should be able to do. I was headed for disaster if I didn't make tough decisions, take drastic measures."

Most frustrating for him was his inability to run and play sports with his three young sons (ages 7, 3, and 18 months at the time). After years of testing various standard and imaginative diets, working with a dozen personal trainers and joining multiple gyms, he knew he had to make a change.

"We had exhausted all options," said his wife, Allie.

Making the commitment

Elliot, 40, had considered weight-loss surgery, but was hesitant to take the next step. He asked a friend, fellow chef Grant Achatz, who spoke highly of his care at the University of Chicago Medicine. "So that was where I focused," Elliot said.

At his initial appointment, he met Vivek Prachand, MD, an expert in minimally invasive abdominal surgery. "We immediately connected," Elliot said. "He totally understood my unique situation as a chef who happens to be on a food-related TV

show. I was worried about not being able to do either, so Dr. Prachand being a foodie was definitely a bonus."

After an extensive multidisciplinary evaluation, followed by a series of discussions and counselling, Elliot underwent obesity surgery.

The changes have been remarkable. Before surgery, Elliot could barely run. It was difficult for him to get in or out of a car, tie his shoes or play with his kids. He would have had trouble walking a mile, had he tried. Four months after his operation, he was able to finish a five-kilometre race. He covered the course in less than 35 minutes.

"Running that first 5K was awesome," Elliot said. "Allie was right there beside me, my nurse and cheerleader."

Six months later, Elliot no longer required a machine to keep his airway open while he slept. By nine month following the surgery, his weight had dropped from 396 to less than 250 pounds, his blood pressure was nearly normal and his cholesterol levels had radically improved.

"I thought it would take two or three years to do this," he told a reporter from *People Magazine* back then. He expected to lose just 60 or 70 pounds the first year. Losing up to 100 pounds would be more typical, according to Prachand, associate professor of surgery, director of minimally invasive surgery, and surgery quality chief at the University of Chicago. But Elliot was not typical.

He did his research, Prachand said. He knew all of his options. He had his family to support and motivate him and was "absolutely committed to making the necessary lifestyle modifications that allow his procedure to work most effectively."

A switch in time: Nothing up my sleeve

There are several surgical options for obese patients; the UChicago Medicine team has significant experience with all of them. When Elliot first came to the clinic, he saw himself as a candidate for a duodenal switch (DS), a procedure that combines a gastric sleeve with a realignment of the digestive tract that helps patients limit their food intake and decreases calorie absorption.

"The duodenal switch is generally the best option for patients with a body-mass index of 50 or more plus metabolic problems associated with severe obesity," Dr. Prachand said. "Graham technically fit those criteria, but as with all of our patients, we had to carefully consider his circumstances, particularly as they related to his career."

Duodenal switch patients lose some of their capacity to process and absorb dietary fats. Even small servings of fatty foods can trigger cramps, bloating, and other intestinal distress.

"Obviously this could interfere with his role as a chef and as a judge of dishes created by contestants on MasterChef," Dr. Prachand said. Multiple small tastings is central to Elliot's work.

So Dr. Prachand suggested a less extensive operation, called the gastric sleeve, which is one component of the DS. A gastric sleeve makes the stomach about 80 percent smaller, the size and shape of a small banana, but it doesn't interfere with nutrient uptake or digestion.

Watch video

Graham Elliot on the TODAY show: Being healthy for my family was the trigger to losing 130 pounds (59kg).
http://tinyurl.com/y72a28d5

"It was a reasonable way to start," Dr. Prachand said "If it wasn't sufficient by itself; we could follow it with the rest of the DS at a later time."

"Fortunately, Elliot turned out to be an optimal patient," Dr. Prachand said. Surgery went smoothly. Elliot recovered quickly and has since been a role model for healthy eating and exercise.

Once a patient commits to surgery and is encouraged by their initial progress, they find it much easier to engage in long-overdue lifestyle changes, Dr. Prachand said. Elliot began exercising at least every other day, including longer and longer runs.

"The key is for movement and exercise to become an inherent and enjoyable part of what we do in our everyday lives," Dr. Prachand said, "not a set-aside item that is 'nice to do'."

Elliot has changed the way he eats at home and on the job. No more late-night burgers and Cheez-Its. Now it's salmon or chicken, with salad or vegetables. His desserts are more likely to include fruit with cottage cheese, or apple slices dipped in peanut butter.

"I now look at food as fuel and focus on my protein intake," he said. "I'm in love with 'pure' flavours, things that are natural and delicious, minimally fussed with, that showcase the season. I combine that with portion control."

Dr. Prachand, who has done more than 1,000 minimally invasive weight-loss operations is proud of the collaborative process with the patient. "Our team does a phenomenal job of educating patients," he said. "But our patients also have to educate us as to what they want to accomplish and what they anticipate." MEH

We are already experiencing the health impacts of climate change

Climate change is already having an impact on health, impacting on labour productivity, the spread of infectious disease and exposure to air pollution and heatwaves, and affecting countries worldwide, according to the first report of *The Lancet* Countdown on Health and Climate Change.

While there is some evidence of early adaptation and mitigation strategies being implemented in some areas, the authors warn that further progress is urgently needed.

The Lancet Countdown on Health and Climate Change is a comprehensive annual analysis tracking progress on climate change on 40 key indicators. The project is a collaboration between 24 academic institutions and intergovernmental organisations including the World Health Organisation and World Meteorological Organisation.

By combining multiple data sources, undertaking new analysis and devising new indicators, the report tracks progress in five areas: climate change impacts, exposures and vulnerabilities; adaptation planning and resilience for health; mitigation actions and health co-benefits; economics and finance; and political and public engagement.

Heatwaves

Between 2000 and 2016, an estimated 125 million adults over 65 were exposed to heatwaves, with possible health impacts ranging from heat stress or heat stroke to exacerbations of pre-existing heart failure or increased risk of kidney injury from dehydration.

Increasing temperatures have also resulted in an estimated reduction of 5.3% in labour productivity for people doing manual, outdoor labour in rural areas, impacting the livelihoods of individuals, families and communities.

The total value of economic losses (linked to physical assets rather than ill health) resulting from climate-related extreme weather events was estimated at US$129 billion in 2016. Losses account for a much higher proportion of GDP in low income compared to high income countries, and 99% of losses in low-income countries are uninsured.

> Tackling climate change directly, unequivocally and immediately improves global health. It's as simple as that. Most countries did not embrace these opportunities when they developed their climate plans for the Paris Agreement. We must do better. When a doctor tells us we need to take better care of our health we pay attention and it's important that governments do the same.

Infectious diseases

The rate of transmission of some mosquito-borne infectious diseases has also increased, with the vectoral capacity for the transmission of dengue fever by the *Aedes Agypti* mosquito increasing by 9.4% since 1950. The number of cases of dengue fever has nearly doubled every decade.

The number of people with undernutrition in 30 countries in Asia and Africa has increased from 398 to 422 million since 1990. Climate change is expected to have an impact on crop production, with a 1°C rise in temperatures associated with a 6% decline in global wheat yields and a 10% decrease in rice grain yields.

Professor Anthony Costello, Co-Chair of *The Lancet* Countdown and a Director at the World Health Organization says: "Climate change is happening and it's a health issue today for millions worldwide. The outlook is challenging, but we still have an opportunity to turn a looming medical emergency into the most significant advance for public health this century. As we move in the right direction, we hope for a step-change from governments to tackle the cause and impacts of climate change. We need urgent action to cut greenhouse gas emissions. The health and economic benefits on offer are huge. The cost of inaction will be counted in preventable loss of life, on a large scale."

Between 2007 and 2016, there were on average 306 weather-related disasters (mainly floods and storms) per year, representing a 46% increase since 2000. As events worsen over time, the authors warn that current levels of adaptation will quickly become insufficient.

Adaption and mitigation

An increasing number of countries and cities are developing preparedness plans to mitigate the impact of climate change. In 2016, 449 cities worldwide reported having undertaken a risk assessment. However, the majority were in high income countries, with 83% of European cities surveyed, compared to 28% of African cities.

Climate-related events, such as storms or floods, can impact on the capacity to provide medical care, for example by interrupting electricity supply, transport, communications or IT. Adaption spending for health accounts for 4.6% of total global adaptation spending, and the authors call for scale-up of financing for climate resilient health systems.

Professor Hugh Montgomery, Co-Chair of *The Lancet* Countdown and Director of the Institute for Human Health and Performance, University College London, adds: "We are only just beginning to feel the impacts of climate change. Any small amount of resilience we may take for granted today will be stretched to breaking point sooner than we may imagine. We cannot simply adapt our way out of this, but need to treat both the cause and the symptoms of climate change. There are many ways to do both that make better use of overstretched healthcare budgets and improve lives in the process."

Some evidence suggests a decline in the use of private motorised vehicles in cities in the USA and Australia, but there has been little improvement for cities in emerging economies. While transport is still heavily dominated by gasoline and diesel, non-conventional fuels (e.g. biofuels, and natural gas) and electric vehicles are gaining traction, particularly in Europe and the USA. However, these figures remain modest when comparing the overall sales of electric cars per year (77 million) and the global total fleet of 1.2 billion cars. Electric vehicles are expected to reach cost-parity with traditional cars by 2018.

In 2015, more energy from renewable sources (solar, wind, hydroelectric) was added to the global energy mix, compared to fossil fuels. However, to remain on the pathway to reaching the Paris Agreement by 2050, this needs to increase by 2.5 times the current levels. In 2016, employment in the renewable energy sector reached 9.8 million people, 1 million more than are employed in the fossil fuel extraction sector.

However, global exposure to air pollution (fine particulate matter PM2.5) has increased by 11.2% since 1990, and about 71% of 2971 cities monitored by WHO exceed the recommended levels of PM2.5. The report concludes that momentum is building across a number of sectors, but that further progress is urgently needed.

Christiana Figueres, Chair of The Lancet Countdown's High-Level Advisory Board and former Executive Secretary of the UN Framework Convention on Climate Change, explains: "The Lancet Countdown's report lays bare the impact that climate change is having on our health today. It also shows that tackling climate change directly, unequivocally and immediately improves global health. It's as simple as that. Most countries did not embrace these opportunities when they developed their climate plans for the Paris Agreement. We must do better. When a doctor tells us we need to take better care of our health we pay attention and it's important that governments do the same." MEH

> Climate change is happening and it's a health issue today for millions worldwide. The outlook is challenging, but we still have an opportunity to turn a looming medical emergency into the most significant advance for public health this century.

Dr Monica Thallinger with Alia. Alia showed up just before the Eid feast, with her hair bleached and dark make-up on, looking like a rock star. She had made a remarkable recovery.

Taking care of children injured in battle for Mosul

By **Monica Thallinger,** Paediatrician

"The dust of mortars and artillery was still filling the air when I arrived in West Mosul at the end of July. All around us everything was destroyed. Houses torn apart, burned out cars on house roofs, rocket craters, bullet-perforated fences. Empty streets. The only interruptions to this monotonous rubble road were checkpoints, one after another. The fighting had stopped and the scenery on the way to the hospital was devastating.

Amidst the rubble the hospital building appeared, seemingly anonymous from the outside. The inside revealed a different story. The burned-out building had been transformed by crafty MSF logisticians into a clean, modern small hospital. It looked like it could be a clinic in many countries. I was shocked and amazed. Never in my eight previous assignments with MSF had I seen such a nice facility with basic technology already in place so quickly after its inauguration.

As soon as I arrived at the hospital, I got to know the staff and patients. My colleagues were a mixture of specialists, junior doctors and trained nurses.

There were no other NGOs working in West Mosul at the time, and the local general hospital suffered severe shortages in equipment, medications and staff.

From the beginning, the most patients we have seen in the Emergency Room (ER) have been paediatric cases and the number of cases admitted has risen each day.

Three years under IS (Islamic State) control and nine months of fighting by the Iraqi coalition to retake the city had taken an enormous toll on one of the city's most vulnerable groups: children.

The ER was often overloaded with screaming and sick children of all ages. We saw children who were malnourished, suffering from complications related to chronic diseases like diabetes, or were dis-

An infant, rescued from the battle for Mosul. She is the only surviving member of her family.

Al Salam hospital, destroyed during the battle for Mosul, Iraq.

abled due to war injuries. Some were born sick. Many had developed psychological problems.

The number of sick and injured infants and children was far higher than the number of adult trauma cases that resulted directly from the battle on the frontlines. Traumatised families repeated the same horrific stories of the destruction, violence and loss they had suffered during recent years. Meeting these patients was challenging. It required me to be much more than just a doctor.

Alia

Alia, 8, was injured when her family home was bombed. Her mother was killed. She suffered several injuries and both her legs were badly broken. She underwent surgery elsewhere to repair the damage. Her legs were held together by metal rods which was painful and disabling. Alia was not only physically affected, she was also anxious and psychologically traumatised. She stopped eating and became anorexic.

I wondered whether the psychological repercussions were worse than her physical injuries. She came several times a week for wound dressings, always carried by her caring father and accompanied by her worried aunt. We all got to know her well and were extremely worried about her condition as she became a shadow of herself. Because our new mental health counsellor hadn't arrived yet, the only thing we could offer were conversations, advice and some toys. Where should we start her healing? It was a team effort to make her experience in the hospital as pleasant as possible. Everyone chipped in, from the triage nurse to the stretcher bearers to the cleaners.

Then at one point something abruptly changed. She started eating again, talking, joking, playing, being a rascal and stealing our pens. Everyone was fond of Alia as she transformed from a terrified little girl into an irascible, selfie-taking young lady. She blossomed into another child. We had Coca-Cola with chips during our conversations. She showed up just before the Eid feast, with her hair bleached and dark make-up on, looking like a rock star. We celebrated her chosen outfit of the day together with her family. She got better and better, both physically and psychologically.

Her father now always comes with a big smile on his face and is thankful for the help his daughter has received. Alia's wounds are healing and she will soon stop coming to the hospital. She has gained weight and looks well. She smiles more often now. We will miss her.

A boy is received at the MSF hospital in West Mosul with extensive burns to his arms and legs from the battle for Mosul.

The scene driving to work is changing dramatically. Life is slowly returning to West Mosul. The streets are transforming every day. Shops are opening, and goats are roaming around the numerous trash areas eating plastic. The Ferris Wheels are filled with squealing children. Despite the traumatic events that have dominated the lives of our patients and staff over the last three years, it amazes me that they continue to come to work. They continue to make tea for everyone at lunch, and they continue to share their lunch with us. School will start soon, and I can imagine "Alia" with her backpack and neatly plaited hair walking to join her friends at school. Insha'Allah. MEH

MSF UAE

MSF has been in UAE since 1992 under the patronage of Sheikh Nahyan Bin Mubarak Al Nahyan, the UAE Minister of Culture, Youth, and Community Development. MSF in UAE consists of Executive, Finance, HR & Administration, Communications & Fundraising, Logistics and Desks (program manager, HR, Finance, logistics and medical referent).

■ Visit: *www.msf-me.org*

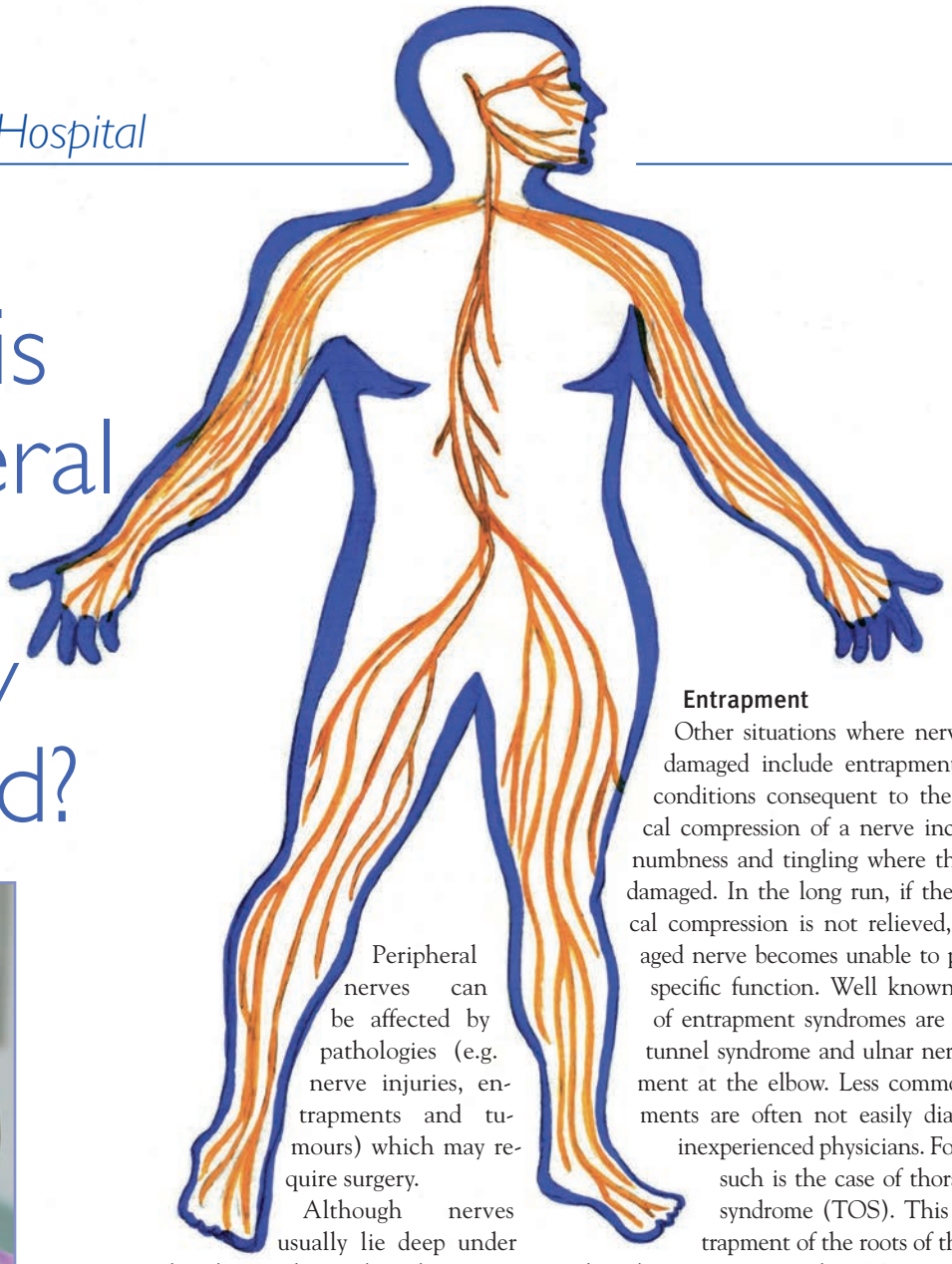
The Author

Dr Monica Thallinger is a paediatrician. Since the end of July, she has been taking care of Iraqi children in a MSF hospital in West Mosul.

When is Peripheral Nerve Surgery required?

By Dr Debora Garozzo
Consultant Peripheral Nerve Surgeon
Neuro Spinal Hospital – Dubai

The Nervous System functionally coordinates our body's actions. It consists of a Central Nerve System (CNS) and a Peripheral Nerve System (PNS). The CNS encompasses the brain and the spinal cord. The PNS is a complex network of enclosed bundles of long fibres. The nerves connect the CNS to every part of the body. The sensory nerve fibres pick up sensorial (visual, tactile, etc.) information from the distant organs (e.g. the eyes, the ears and those away from the brain like the limbs) and carry them to the CNS. In turn, the motor fibres transmit signals from the brain to the various parts of the body to perform the action. For example, on seeing a flower, visual and olfactory information is conveyed to the brain that recognises it and consequently transmits messages to the arm and hand to perform the action necessary to pick the flower.



Peripheral nerves can be affected by pathologies (e.g. nerve injuries, entrapments and tumours) which may require surgery.

Although nerves usually lie deep under the skin and muscles, they are exposed to physical damage. Nerve injuries occur in 25% of overall traumas. They can occur alone or be associated with other injuries (head injuries, spine injuries, bone fractures, etc.). A nerve injury results in the loss of sensory and motor function in the region (the skin and the underlying muscles) controlled by that nerve. For instance, a humeral fracture associated with a rupture of the radial nerve leads to a wrist drop.

Sometimes the trauma can damage the whole group of the nerves (brachial plexus) controlling the function of the upper limb, with various degrees of functional impairment, the most extreme being a flail arm. Such an event is likely to occur in adults after trauma such as motorcycle accidents, or in babies following a difficult delivery (Erb's Palsy). If the nerve damage is reversible, spontaneous recovery can occur, but should a nerve rupture be suspected, the only possibility to rescue the patient from severe disability is a surgical reconstruction of the nerve.

Entrapment

Other situations where nerves can be damaged include entrapment. Medical conditions consequent to the mechanical compression of a nerve include pain, numbness and tingling where the nerve is damaged. In the long run, if the mechanical compression is not relieved, the damaged nerve becomes unable to perform its specific function. Well known examples of entrapment syndromes are the carpal tunnel syndrome and ulnar nerve entrapment at the elbow. Less common entrapments are often not easily diagnosed by inexperienced physicians. For example, such is the case of thoracic outlet syndrome (TOS). This is the entrapment of the roots of the brachial plexus. Patients with TOS complain about severe pain radiating along the shoulder and the whole upper limb and associated with intense numbness and tingling especially on the last two or three digits of the affected hand. In entrapment syndromes, the surgeon relieves the compression on the nerves, providing relief from the painful symptoms.

Nerve tumours

Peripheral nerve surgeons are empowered with the technical skills necessary to remove nerve tumours. In most cases the tumour grows inside the nerve, displacing its fibres or enveloping them within its mass. The surgeon identifies and isolates the nerve fibres to prevent the tumour, otherwise a palsy will be detected after the procedure. There is also a genetic disease (Neurofibromatosis) associated with constant tumour growth along the nerves.

Peripheral nerve surgeons should possess an excellent knowledge of neurology. Their experience and specific technical skills allow them to apply the best procedural strategy tailored for each case. MEH

Elekta and Brainlab collaborate to streamline treatment workflows for stereotactic radiation therapy

Integration of Versa HD linear accelerator and ExacTrac empowers clinicians to optimize radiation therapy inside and outside the brain

Elekta (EKTA-B.ST) and Brainlab have reconfirmed their alliance for the integrated use of the Elekta Versa HD™ linear accelerator and Brainlab ExacTrac® patient positioning and monitoring technology. The integration of these two technologies offers high definition stereotactic radiosurgery (HDRS) treatments with versatile patient positioning and monitoring through simplified workflows.

For the first time, a Versa HD system augmented with ExacTrac was displayed at the Elekta booth during the American Society for Radiation Oncology (ASTRO) Annual Meeting, in September in San Diego.

The number of stereotactic radiosurgery (SRS) and stereotactic body radiation therapy (SBRT) procedures is expected to increase dramatically between 2014 and 2024 (70% and 103%, respectively). This growth is substantially larger than the estimated increase in the number of patients estimated for these treatments (22% and 26%, respectively), reflecting the wider adoption of stereotactic radiation to treat intra- as well as extra-cranial tumours. Innovative workflows that address the challenges associated with using these procedures for different anatomies are essential to ensuring a high degree of safety, efficacy and efficiency.

In line with the growing adoption of radiosurgery, the Versa HD HDRS and ExacTrac solution will provide clinicians the following benefits:

- Support the delivery of high definition stereotactic treatments in standard treatment slots, regardless of tumor complexity or anatomy
- Frameless stereotactic solutions for multiple anatomical applications
- Integrated workflows and robust image guidance and motion management during delivery for coplanar and non-coplanar treatments

Nearly 70 leading cancer centres across the globe have acknowledged and utilized the mutual benefits of Versa HD together with ExacTrac.

Ludwig-Maximilian University (LMU) Hospital in Munich has used the integrated system for more than two years. "The integration of Versa HD and ExacTrac enables a seamless workflow that allows us to improve patient comfort while reducing treatment time," said Professor Claus Belka, MD, Director Department of Radiation Oncology at LMU. "Combined, these technologies give us the flexibility to treat complex tumours that require extremely precise targeting using the same systems with which we treat more conventional cases. This helps us to reduce the cost of delivering quality care to all of our patients."

The companies have a history of collaborating to provide innovative solutions to not only the radiosurgery community but also neurosurgery. In September 2016, the companies announced an agreement designed to ensure the continuous evolution of interoperability and safety of Elekta's Leksell® Vantage™ Stereotactic System and Elements Stereotaxy treatment planning and verification software from Brainlab. The integrated use of both systems is designed to improve the safety and accuracy of stereotactic neurosurgical procedures. In June 2017, the companies announced that Brainlab would be the authorized distributor of Elekta's stereotactic solutions for neurosurgery in selected markets.

"The combination of these technologies will help advance the care and outcomes of patients undergoing SRT and may make this important treatment option available to more patients," said Maurits Wolleswinkel, Elekta's Chief Strategy Officer. "We are pleased to expand our collaboration with Brainlab, a company that shares our commitment to using innovation to improve patients' lives and increase the efficiency and efficacy of the radiation therapy treatment continuum."

"Brainlab has always strived to provide streamlined treatment workflows and solutions to improve cancer treatments for patients. Intra-operability with various delivery systems was key for Brainlab to achieve that," commented Claus Promberger, Director Product Definition at Brainlab. "The partnership with Elekta is a great testimony to the potential of ExacTrac as a versatile and precise patient monitoring and positioning system."

- To learn more about Versa HD, visit elekta.com/VersaHD. *http://www.elekta.com/VersaHD*
- To learn more about ExacTrac visit brainlab.com/ExacTrac *https://www.brainlab.com/en/radiosurgery-products/exactrac* MEH

Timesco Callisto Flare preloaded LED single-use handles

Over the past decade Timesco has become market leader in the field of laryngoscopy with an unrivalled range of quality brands; reusable: fibre Optima, Sirius, standard Orion and single use: fibre Callisto, Freeway and standard Europa light.

Timesco's range of laryngoscopes have been further upgraded with the addition of an LED light for the reusable and single-use handles and standard blades.

The single-use Callisto range has been expanded with the addition of Callisto Flare LED single-use dry cell and preloaded handles which are supplied complete with batteries. The Callisto Flare LED handles are available individually and also paired with the Callisto blades, Freeway blades as handle and blade packs, ready to use.

Timesco's Callisto and Freeway single-use laryngoscopes offer control of cross contamination, no reprocessing or autoclaving costs and convenience.

In a recent study in USA comparing costs of the reprocessing of reusable and single-use laryngoscopes it was found that the reprocessing cycle cost for reusable blades and handles was $17 and if there was a Hospital Acquired Infection the cost would increase to $27.

The Callisto system is latex free, non toxic and can be disposed in standard hospital waste. Timesco products are ISO, CE, FDA, SFDA, etc, worldwide approved.

- For more information please visit: *www.timesco.com*

World's first cochlear implant powered by wireless charging launched by MED-EL

MED-EL, the leading provider of hearing implant systems, has launched the world's first cochlear implant audio processor to feature wireless charging. Utilising a ground-breaking design, the RONDO 2 frees implant users from the need to regularly replace batteries, making the device easy to use, more cost effective and friendlier to the environment.

Wireless charging allows users to power their implant with 18 hours of battery life for four-hour charge, giving users a full day of hearing from one overnight charge. It also saves users the hassle of replacing the disposable batteries that power the device. In a single year, powering the device every day would require more than 700 batteries, which is not necessary anymore.

"We are so used to charging our devices at home overnight," says David Raetz, CEO MED-EL Middle East. "We charge phones and tablets this way, so why not audio processors? It's the next logical step for cochlear implants and we are so excited to be pioneering the way forward."

Cochlear implants are small implantable devices that allow people with profound hearing loss to experience the sensation of sound by electrically stimulating the inner ear. RONDO 2 is the external part of the implant, attached magnetically on the head, and functions as an audio processor, picking up and transmitting sound to the internal implant. The RONDO 2 uniquely combines a transmitter coil, control unit and power source into a single device – a single unit processor – meaning it can be worn with glasses or hidden completely under hair.

RONDO 2, and its accessories, will be available in the region from the end of 2017.

- For more information visit: *http://rondo2.medel.com*

Introducing the new POC Connect data management solution for the DiaSpect haemoglobin analyser

POC Connect is the world's first mobile data management solution designed for a reagent free haemoglobin testing device.

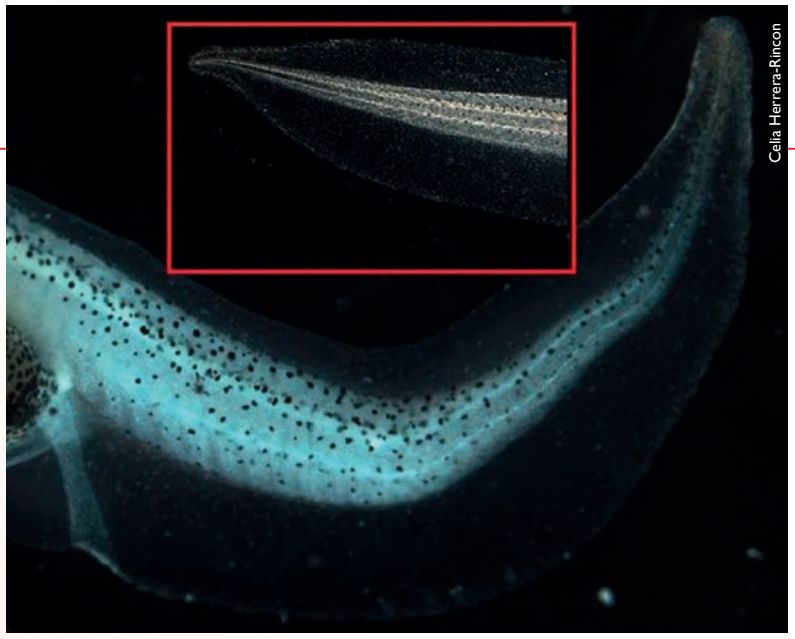
The simple android application enables you to store, access and transmit haemoglobin results directly from a DiaSpect Tm haemoglobin analyser to a smartphone via Bluetooth® technology.

All you need is an android phone and a 'DiaSpect' device and you are able to record haemoglobin results and link with unique IDs, QC information, Cuvette LOT numbers, comments and dates and times. Flexible configuration options allow you to customize the recorded data per your needs. This data is held in a history list that can be transferred easily via a file download or through email to a central database or lab information system (LIS).

The DiaSpect device can be purchased with integrated Bluetooth, meaning there is no need to purchase an additional external Bluetooth dongle. This new solution will prove useful in countries with challenging environmental and geographical conditions where remote haemoglobin testing and access to internet can often be challenging.

- For more info on POC Connect visit: *www.ekfdiagnostics.com/POCConnect*

Brain guides body much sooner than previously believed



The brain protects against developmental defects early in embryogenesis. Without a brain, frog embryos exposed to a teratogen developed an abnormal, curled tail and spine. In contrast, embryos with brains developed normal tails and spines [inset] even after exposure to the same teratogen.

By Kimberly M. Thurler

The brain plays an active and essential role much earlier than previously thought, according to new research from Harvard's Wyss Institute for Biologically Inspired Engineering and Tufts University scientists, which shows that long before movement or other behaviours occur, the brain of an embryonic frog influences muscle and nerve development and protects the embryo from agents that cause developmental defects. Remarkably, the brain performs these functions while it is itself still developing, marking the earliest known events of the brain-body interface.

In addition to identifying these essential instructive functions for the first time, the researchers successfully rescued defects caused by lack of a brain by using widely available, human-approved drugs.

The discoveries, reported in *Nature Communications* (25 September 2017), could expand understanding of human cognition and neuroplasticity and lead to better ways to address birth defects, treat injuries and regenerate or bioengineer complex organs.

"Everyone knows that the brain guides behaviour, but this data suggests that we need to revise our view of the brain as quiescent prior to an animal's independent activity. Our research shows that the brain is engaged long before that, before it's even fully built. What is particularly promising on the therapeutic side is that we were able to reverse developmental defects that result in the absence of a brain by applying relatively simple bioelectric and neurotransmitter manipulations," said the paper's corresponding author, Michael Levin, Ph.D., Wyss Institute Associate Faculty member and Vannevar Bush Professor of Biology and Director of the Tufts Center for Regenerative and Developmental Biology and the Allen Discovery Center at Tufts.

Rescuing 'birth' defects

To examine the role of the brain during early development, the researchers removed the brains of *Xenopus laevis* frog embryos 27-1//2 hours after the eggs were fertilized, long before independent embryonic activity occurs.

Brainless embryos showed problems in three main areas. Most obvious was abnormal development of the muscles and the peripheral nervous system. Collagen density diminished, and muscle fibres were shorter and lacked the characteristic chevron patterning found in normal embryos. Peripheral nerves also grew ectopically and chaotically throughout the trunk, revealing that even regions far away from the brain depend on its presence and activity for normal embryogenesis.

In addition, when exposed to chemicals that do not cause birth defects in normal embryos, embryos without brains developed severe deformities, such as bent spinal cords and tails. These results demonstrated that the normal brain provides a protective effect against exposure to influences that without the brain's activity would act as potent teratogens.

Importantly, the researchers were able to rescue many of these defects by administering scopolamine, a drug used to regulate human neural function, or injecting messenger RNA encoding the HCN2 ion channel, which modulates bioelectric signals in many contexts and animals, including humans.

"Our data suggests that the brain exercises these functions using electrical and chemical channels that communicate locally and at a distance. Such distributed communications means we may be able to repair damage in a difficult-to-reach site by providing therapies to more easily-accessible tissues. Being able to treat one part of the body and see results in another part is particularly valuable in specialties like neuroregeneration," said the paper's first author, neuroscientist Celia Herrera-Rincon, Ph.D., a Postdoctoral Researcher in the Levin laboratory.

Future research will focus on decoding the specific information being sent through the newly identified communication channels from the brain, identifying other body structures that require brain presence, exploring relevance in other species, and honing the ability to provide brain-like signals in other contexts to improve complex patterning and tissue repair.

Levin is particularly fascinated by the question of how the brain, or any structure, can deliver information while it's still being built and whether other organs have similarly special roles.

"The brain and body form a feedback loop; the brain is being constructed by the embryo's patterning activities even as it itself is contributing instructive guidance to those processes – a delicate balance between structure and function. Explaining this could lead to understanding how brains keep memories during massive remodelling and regeneration. We might one day be able to regenerate portions of the brain while the memories were still intact," he said. "We have already found that the brain performs important functions at this stage of development, and my guess is this is only the tip of the iceberg." MEH

Agenda

Selected schedule of regional medical meetings, conferences and exhibitions

Event	Date / City	Contact
November 2017		
8th Global Obesity Conference	14 – 15 November, 2017 Dubai, UAE	*www.obesitymeeting.conferenceseries.com*
8th World Congress on Healthcare and Medical Tourism	17 – 18 November, 2017 Dubai, UAE	*www.healthcare.global-summit.com/middleeast/*
Emirates Dermatology Conference	17-19 November 2017 Abu Dhabi, UAE	*http://conference.edsuae.com/*
Emirates Dermatology Conference	17-19 November 2017 Abu Dhabi, UAE	*http://conference.edsuae.com/*
5th International Conference on Physiotherapy	27 – 28 November, 2017 Dubai, UAE	*www.physiotherapy.conferenceseries.com*
International Conference on Cancer Diagnostics	27 – 28 November, 2017 Dubai, UAE	*www.cancerdiagnostics.conferenceseries.com/middleeast*
22nd Global Vaccines & Vaccination Summit	30 November- 1 December, 2017 Dubai, UAE	*www.vaccines.global-summit.com/middleeast*
December 2017		
World Vaccine Summit and Expo	4-6 December, 2017 Dubai, UAE	*http://worldvaccinesummit.com/*
Global Cancer Meet and Expo	4-6 December, 2017 Dubai, UAE	*https://globalcancermeet.com*
Emergency Medicine	6-9 December 2017 Dubai, UAE	*www.esemconference.ae*
29th World Psychiatrist Meet	7-9 December, 2017 Dubai, UAE	*http://psychiatrist.conferenceseries.com*
Gulf Obesity Surgery	7-9 December, 2017 Dubai, UAE	*www.goss2017.com*
25th Global Diabetes Summit and Medicare Expo	11 – 12 December, 2017 Dubai, UAE	*www.diabetesexpo.com/middleeast*
10th International Conference on Gastroenterology	14 – 15 December, 2017 Dubai, UAE	*www.gastroenterology.conferenceseries.com/asiapacific*
7th International Society of Nephrology	13-16 December, 2017 Dubai, UAE	*www.nephrology.emanuae.com*

Agenda

Selected schedule of regional medical meetings, conferences and exhibitions

Event	Date / City	Contact
January 2018		
Emirates Rhinology and Otology	17-19 January 2018 Dubai, UAE	*www.emiratesrhinologyandotology.ae*
Arab Health Exhibition	29 January – 1 February 2018 Dubai, UAE	*www.arabhealthonline.com*
February 2018		
Transcatheter Solutions	15-17 February 2018 Dubai, UAE	*www.4tsconference.com*
March 2018		
EDEC (Emirates Diabetes Society)	1-3 March 2018 Dubai, UAE	*www.edec-uae.com*
IGDC (International Growth & Development)	15-17 March 2018 Dubai, UAE	*www.igdconference.com*
5th Evolving Practice of Ophthalmology Middle East Conference (EPOMEC 2018)	15-17 March 2018 Dubai, UAE	*www.epomec.ae*

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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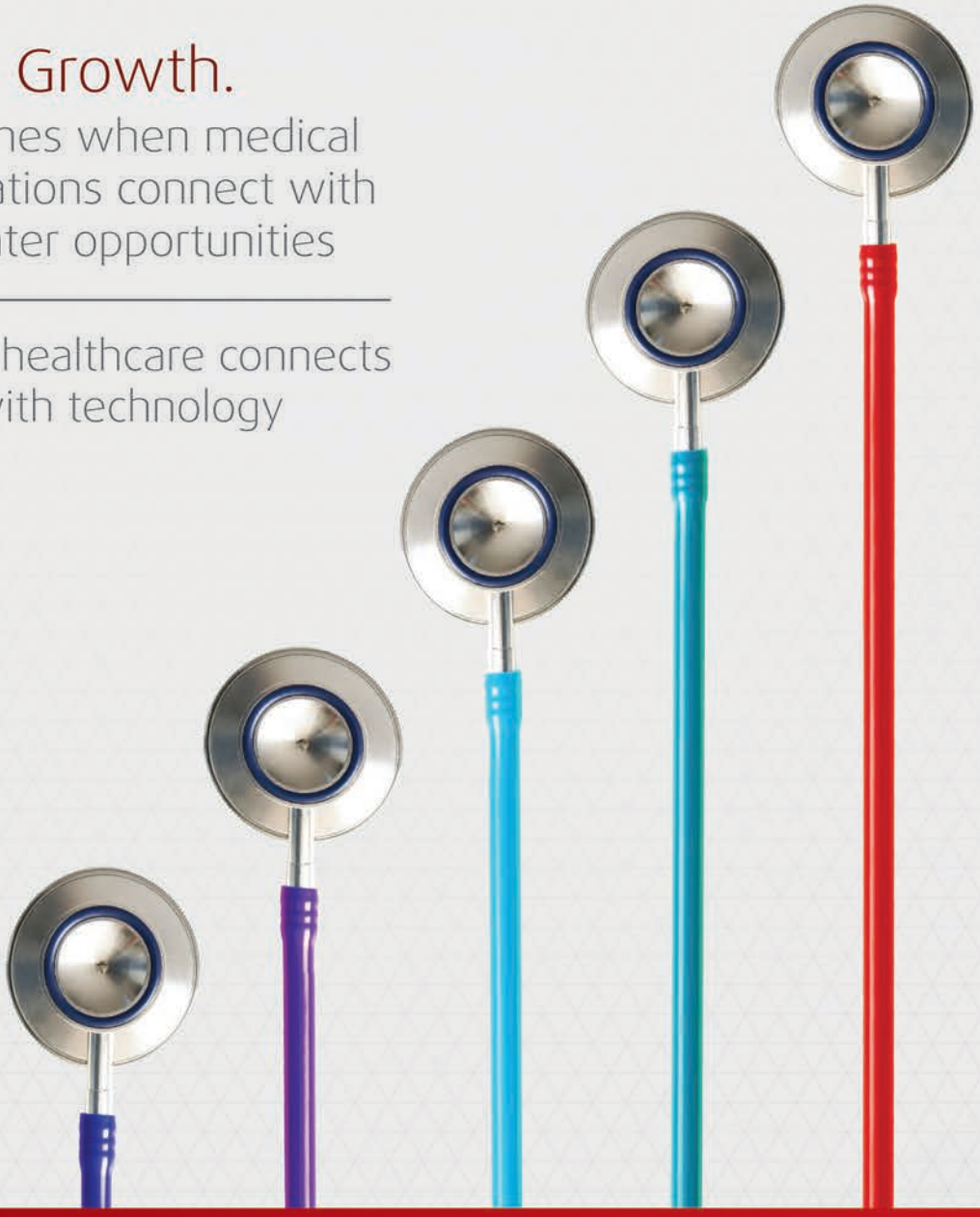

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