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November-December 2016

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Emergency response

63rd WHO EMR Committee meeting
highlights plight of aid agencies
as regional crises deteriorate

Life-expectancy up

But global study says
progress not universal

Modular construction

Futuristic hospital design
being used in India

In the News:

- Americas region first in world to eliminate measles
- World leaders commit to tackling antimicrobial resistance
- 92% of world population live with air pollution

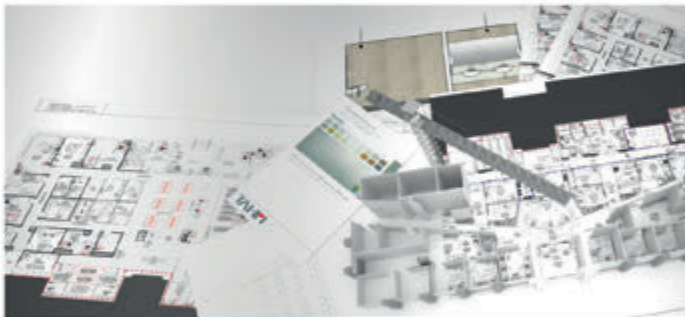


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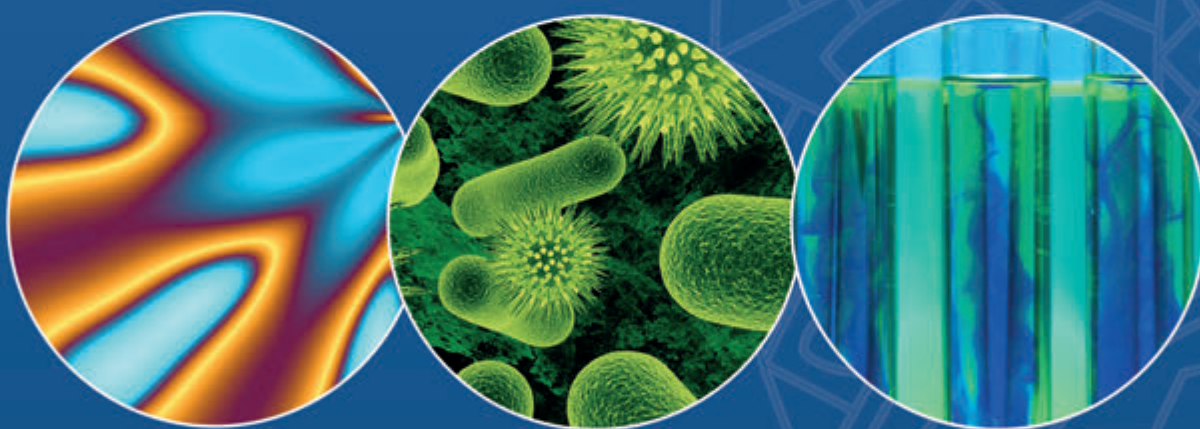


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Prognosis

Health of the world

One of the leading news stories in the healthcare arena now is the release of the Global Burden of Disease report by *The Lancet*. The report stems from a massive collaborative study bringing together 1870 independent experts in 127 countries and territories to provide the most up-to-date analysis on the state of the world's health. Overall, the report shows that, globally, people's health is improving, but warns that this improvement is not universal. We give an overview of the report and provide a specific focus on the Middle East region.

Also in this issue, we report on the recent WHO Eastern Mediterranean Regional Committee's 63rd annual meeting in Cairo. Topping a full agenda at the meeting of health ministers and leading stakeholders in regional healthcare were the issues of health security and emergency response to regional health crises. As Dr Ala Alwan, WHO Regional Director, Eastern Mediterranean Region, pointed out: "Viruses know no borders. This led us, as a region, to take a major role in the past year in pushing for global harmonization of the independent assessment process and a new globally agreed-upon mechanism" to provide health security. The organisation's efforts to provide healthcare assistance to millions of people displaced by war in Yemen, Syria and Iraq has proved challenging. Speaking at the opening session WHO's Director-General, Dr Margaret Chan, spoke out strongly against the continued indiscriminate bombing of healthcare facilities in these countries, saying it "must stop. Nothing sets hard-won health gains backwards so dramatically as humanitarian crises on this scale".

In the United Kingdom report we look briefly at some of the innovative products British companies will be bringing to Dubai for the annual Arab Health exhibition in January. We also report on the recently opened Francis Crick Institute in London which is set to push the boundaries of medical research.

In a broad interview, we speak to Dr Zohair Sebai, a founding father of Saudi Arabia's public health sector, about public health in the kingdom, then and now.

As usual we cover a wide range of medical news from the region and the world, as well as new research emanating from leading medical research institutions.

Stay informed.

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middle east monitor

Update from around the region



Maha Aboughali, Business Development and Marketing Director, Moorfields Eye Hospital Dubai, accepts the IMTJ Medical Travel Award from Chairman of the judging panel and Managing Editor of IMTJ, Keith Pollard.

Moorfields Eye Hospital Dubai wins top award

Moorfields Eye Hospital Dubai (Moorfields), the first overseas branch of Moorfields Eye Hospital in London, was the winner of one of the top awards at the 11th World Health Tourism Congress (WHTC) 2016, presented at the gala awards ceremony held on 5 October at the InterContinental Dubai Festival City hotel. Moorfields was presented with the 'International Eye Clinic of the Year' award for 2016.

The 11th World Health Tourism Congress was held under the patronage of the Government of Dubai, Dubai Health Authority and Dubai Tourism Commercial Marketing. The congress brings together corporate purchasers of healthcare with world-class medical providers, including health authorities and major companies operating in the health tourism industry.

Receiving the award, David Probert, Chief Executive of Moorfields Eye Hospital, said: "I am delighted to receive this prestigious award on behalf of Moorfields. It is due recognition for the efforts of the entire team that has expanded and developed the hospital's reach internationally in recent years, through our first branch hospital here in Dubai, and now our new facility in Abu Dhabi."

Since opening in Dubai in 2007, Moor-

fields Eye Hospital Dubai has treated more than 100,000 patients from more than 180 countries, as well as local and regional patients. Moorfields also puts a strong emphasis on research and teaching, which are part of the hospital's overall mission.

Doha International Academy for Organ Donation launched

The Doha International Forum for Organ Donation organized by the Qatar Organ Donation Center at Hamad Medical

Corporation (HMC) in October saw the launch of the world's first international academy on the important issue of organ donation.

The Doha International Academy for Organ Donation will become a hub for resources and training materials necessary to assist other countries to establish their own programs.

The upcoming facility will be launched under the umbrella of HMC and will utilize the expertise of distinguished international faculty to promote education and research in organ donation in Qatar and internationally.

The launch saw a distinguished group of six international leaders in organ donation and transplantation pledge their support for the Academy and further support HMC's goal to achieve self-sufficiency in organ donation.

The panel included renowned scientists and researchers from the United States, Australia, United Kingdom and Europe who met with senior leaders at HMC and discussed operational strategies and policies that will underpin the work of the Doha International Academy for Organ Donation.

Dr Hanan Mohamed Al Kuwari, the Minister of Public Health said Qatar's organ donation program, with a unified national waiting list, had become a model for

other countries to emulate.

"With fairness and equity at its heart, our program has been recognized internationally and is something we can be proud of," said Dr Al Kuwari. "Qatar's national strategy for organ transplantation is not only world-leading in terms of the clinical and ethical standards it applies, but also one that is appropriate to the healthcare needs of our growing country and our diverse population."

Dr. Yousuf Al Maslamani, Medical Director of Hamad General Hospital and Director of the Organ Transplant Center, said the Academy will bolster Qatar's current organ donation and transplantation programs and support plans for its expansion.

"The Academy, with its group of eminent advisors, will also empower our mission to become a centre of excellence for organ donation both regionally and internationally," Dr Al Maslamani said.

Dr Abdulla Al Ansari HMC's Deputy Chief, Medical, Academic and Research Affairs for Surgical Services said it was a very exciting time for Qatar's program.

"We are certain that the Academy will support Qatar to achieve self-sufficiency in organ donation to meet the needs of the patients locally," he said. "At the same time will have a wider impact on the region by being a hub for collaborative research, education and training in the field of organ donation."

Dr Dominique Martin, Senior Lecturer in Health Ethics at Deakin University in Australia said that Qatar had demonstrated that a small country can deliver on its vision for a safe and fair organ donation program.

"The program of organ donation and transplantation is inclusive of all people living in Qatar, regardless of their nationality, race, gender, income status, social background. It is this spirit of equity and inclusion that is the idea behind the Academy," Dr Martin said.

Donors pledge \$12.9bn to Global Fund

At the launch of the Global Fund's Fifth Replenishment, donors pledged over

US\$12.9 billion for the next three years, demonstrating extraordinary global commitment toward ending the epidemics of AIDS, tuberculosis and malaria for good.

The Global Fund also welcomed the first contribution by Qatar to the partnership, a pledge of \$10 million.

Dr Hanan Mohammad Al Kuwari, Minister of Public Health, Qatar, made the pledge during the Global Fund's Fifth Replenishment Conference in September, which was hosted by Canadian Prime Minister Justin Trudeau in Montreal. World leaders and partners from governments, civil society, the private sector and people affected by the diseases gathered to secure funding for the coming three years.

"Fighting TB and providing access to health services to refugees and displaced populations in the Middle East region are an important priority for Qatar," said Minister Al Kuwari.

The Replenishment Conference raised nearly \$1 billion more than the previous replenishment conference in 2013, and benefitted from participation by leaders from countries all over the world, United Nations Secretary General Ban Ki-moon, and Bill Gates, Co-Chair of the Bill & Melinda Gates Foundation.

The United States led the pledging with \$4.3 billion, approximately one-third of total funding. The United Kingdom pledged £1.1 billion, the second-largest pledge for this replenishment period; France pledged 1.08 billion, maintaining their position as the second-largest donor to the Global Fund overall.

Germany pledged 800 million, a 33 percent increase; Japan pledged US\$800 million, effectively a 46 percent increase when measured in Japanese yen.

Mark Dybul, Executive Director of the Global Fund, thanked Minister Al Kuwari and the people of Qatar, saying the contribution demonstrates a commitment to shared responsibility for global health.

"Qatar is choosing engagement rather than isolation," said Dr Dybul. "Their investment will support programs that save millions of lives, improve access to quality

health services and promote opportunity and social justice."

In the Middle East, programs supported by the Global Fund provide essential HIV, TB and malaria services to key and vulnerable populations including refugees, internally displaced people, women, children and other populations in Iraq, Jordan, Lebanon, Palestine, Syria and Yemen.

Programs supported by the Global Fund have saved 20 million lives since 2002, and averted 146 million new infections since 2012. The Global Fund has also helped stimulate an additional \$6 billion in domestic investments in health by low- and middle-income countries in the most recent three-year period.

"We can end these epidemics for good, if we accelerate our efforts and continue to bring in new partners," said Prime Minister Trudeau.

Trudeau's remarks at the conference embodied a spirit of compassion and commitment to work across borders and find solutions to significant global challenges, like ending AIDS, tuberculosis and malaria as epidemics.

Polio immunization in Iraq

On World Polio Day on 24 October, Iraq's Ministry of Health, with support from UNICEF and the World Health Organization, launched a weeklong nationwide campaign to immunize Iraq's children against polio.

Under the slogan "two drops can change a life," the 5-day campaign aimed to reach an estimated 5.8 million children under the age of 5 in Iraq, regardless of previous vaccination status.

"The Government of Iraq is committed to polio eradication, and conducted 16 campaigns to that end in 2014 and 2015 as part of the Middle East polio outbreak response," said Peter Hawkins, UNICEF Representative in Iraq Peter Hawkins.

Since April 2014, no new polio cases have been reported in Iraq, thanks to the Government's strong commitment and the hard work of frontline workers. In May 2015, Iraq was removed from the list of infected countries.

However, the risks of a resurgence persist due to possible surveillance and immunization coverage gaps among Iraq's displaced populations as well as those living in inaccessible areas and informal settlements.

"There is still a risk of polio returning to Iraq," said WHO Representative to Iraq, Altaf Musani. "Polio transmission is ongoing in Pakistan and Afghanistan and new cases of polio have also been confirmed in Nigeria," he said. "Until transmission is stopped globally, we need to maintain high levels of vaccination coverage and keep surveillance systems strong, to be on the alert for the virus," he added.

The Iraq Polio partnership conducted 2 national immunization rounds in February and April this year, reaching over 91% of the targeted population.

This most month's vaccination campaign will be conducted by the Iraqi Ministry of Health (with support from WHO and UNICEF, with special attention to the most vulnerable children in internally displaced persons (IDPs) and Syrian refugee camps, informal settlements, host affected communities and newly retaken areas. More than 25000 vaccinators will go from house to house during the campaign, visiting families.

WHO covered the operational cost, intra and post campaign monitoring, while UNICEF provided support for focused social mobilization services. In coordination with the Federal Ministry of Health, the Kurdistan Regional Government Ministry of Health, Zain and Korek Telecommunications Company contributed to the social mobilization and communications campaign with a focus on IDPs.

Meanwhile, commenting on the successes of the polio eradication program in the Middle East, said Chris Maher, manager of WHO's regional polio eradication group based in Amman, said: "The continued efforts of governments, partners and communities to protect children in the Middle East from polio have been truly remarkable. But we are not out of the woods yet. Polio continues to circulate in Afghanistan and Pakistan, and recently made a comeback in Nigeria, and so long as there is transmission anywhere,



children in the Middle East remain at risk,” he added. “We cannot afford to be complacent; we must ensure systems are strong enough to keep polio out of the region, until the job is finished in all parts of the world.”

Anirban Chatterjee, the chief of Health and Nutrition in UNICEF Regional office for MENA, added: “Polio resurged in Syria in 2013 and Iraq in 2014, after 14 years of absence in the Middle East. An 18-month multi-country, multi-partner outbreak response, including more than 50 rounds of polio campaigns, successfully stopped the spread of the virus and again made the Middle East polio-free. It is now essential to strengthen routine immunization in all countries in the region and focus on high risk areas to ensure every child is vaccinated, to prevent future outbreaks.”

UAE MoH runs mental health awareness campaign

The UAE Ministry of Health and Prevention launched an awareness campaign on mental health and related disorders under the slogan ‘Live Life.’ Running from October 10 to 17, 2016 in conjunction with the World Mental Health Day, the campaign was unveiled during a Ministry-organized ceremony attended by Dr Youssif Al Serkal, Assistant Undersecretary for the Ministry of Health and Prevention Hospitals Sector; Dr Muna Al Kuwari, Director of the Ministry’s Specialized Healthcare and the National Mental Health Program; and representatives of various local health agencies and institutions.

The campaign aimed to raise awareness of mental disorders, specifically anxiety and depression, which are relatively common disorders, according to research, as well as clarify the vision and objectives of the MOHAP National Mental Health Programme and what has been achieved to date as well as to clarify current projects and future plans.

The awareness campaign included lectures and distribution of booklets about depression and anxiety, as well as a screening survey for anxiety and depression in Primary Health Care centres, commercial centres and universities. A media

campaign targeting local newspapers, radio, television and social media was also launched as part of the seven-day awareness program.

Dr Al Serkal said that the strategic plan of the National Mental Health Programme aimed to provide comprehensive high quality mental health services that are based on evidence and best practice, as well as the development of community psychiatric services for patients with chronic conditions. The mental health program is based on key policies, legislations, and programs and is a result of effective local and global partnerships. This strategy is aligned with the government’s initiative to improve the quality of life in the country and bring happiness to UAE citizens and residents.

Dr Al Serkal announced that Al Amal Hospital has opened a new unit offering community psychiatric services. The hospital-based community mental health team provides regular home visits for chronic patients with frequent relapses, elderly patients with dementia and patients incapable of attending health facilities to provide medical care, psychological counseling and social and family support.

Dr Al Serkal added that a Day Care Center will be opened to provide comprehensive psychosocial and occupational rehabilitation programs for patients with chronic mental illness.

Dr Hussein Abdel-Rahman Al Rand, Assistant Undersecretary of the Ministry’s Health & Prevention Assistant for Health Centers and Clinics Sector, said the Ministry has started integration of mental health services into primary healthcare facilities to ensure patients’ physical and mental well-being. The Ministry is actively encouraging scientific research, the development of an efficient information technology system, and the establishment of a statistical database on mental health illnesses.

WHO releases funds to combat cholera in Yemen

The ongoing conflict in Yemen has left two thirds of Yemenis without access to clean water and sanitation services are limited,

especially in cities, which has led to an outbreak cholera. The risk of catching cholera is further aggravated by a decline in the national health system’s capacity to respond to the outbreak due to critical shortages in resources. As of October 2016, only 45% of all health facilities in Yemen remain functional due to shortages in health staff, medicines and medical supplies.

In response to this crisis, the World Health Organization (WHO) has released approximately US\$1 million from its internal emergency funds to support the ongoing response to the cholera outbreak.

Since the outbreak was announced by Yemen’s Ministry of Public Health and Population on 6 October, a total of 1184 suspected cases of cholera, including 6 deaths, have been reported. 47 cases have tested positive for *Vibrio cholerae*. However, a chronic lack of funding for Yemen is impeding action by WHO and health partners to effectively control and respond to the current outbreak.

These new funds, provided by WHO’s Contingency Fund for Emergencies and the Eastern Mediterranean Regional Emergency Solidarity Fund, will allow WHO to rapidly scale-up priority response activities to effectively monitor and control the outbreak by:

- continuing to scale-up WHO and national surveillance interventions
- enhancing diagnosis capacity by providing essential support to laboratories
- increasing the number of diarrhoea/cholera treatment centres
- training national staff on case definition and management
- pre-positioning medical supplies in high-risk areas
- organizing health education campaigns among at-risk populations.

More than 7.6 million people are currently living in the areas affected by the outbreak, and more than 3 million internally displaced persons are especially vulnerable. Without a sustained response, cases of acute watery diarrhoea/cholera are likely to increase, with predictions of up to 76,000 additional cases across 15 governorates, including 15,200 severe cases requiring admission for cholera treatment. **WHO**

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worldwide monitor

Update from around the globe



Gavi partners with Philips to improve quality of immunisation data

Gavi, the Vaccine Alliance and leading health technology company Royal Philips have signed a letter of intent to jointly develop scalable digital transformation plans aimed at improving the quality of immunisation data and its collection in primary and community healthcare. Their joint goal is to help Gavi supported countries improve the planning, coverage and impact of immunisation programmes. The partnership was announced at the Global Partnership for Sustainable Development Data event in New York in September.

Routine immunisation has played a key role in more than halving the annual number of child deaths since 1990. Nevertheless, around 1.5 million children under the age of five still die every year from vaccine-preventable diseases. Gavi and Philips have a shared vision that robust health IT infrastructures and the digital transformation of immunisation data are key to more resilient health systems. Using new health IT solutions for the development of improved data collection, and new models for better planning, Gavi and Philips will offer interested countries their complementary expertise to help maximise immunisation coverage and effectiveness by identifying children who are missing out on vaccination programmes.

“By working with Philips we plan to protect more children by improving the quality of immunisation data,” said Gavi CEO Dr Seth Berkley. “Weak data leads to poor planning, often meaning that children, whether they live in urban slums or

remote rural outposts, miss out on vaccines multiple times because health workers simply don’t know where to find them. I am pleased that Philips will bring its experience in connected healthcare informatics to help us tackle this problem.”

“We are convinced that partnerships, such

as this one with Gavi, are paramount to realising the goal of universal health coverage for all, especially among children,” said Jeroen Tas, CEO, Connected Care and Health Informatics at Philips. “Thanks to the digital revolution, we can now start doing what was previously unthinkable: enable access to care, improve patient outcomes and lower healthcare costs. Our vision for the partnership is that we will put our strengths in connected health, data analytics and population health management to further good use, by helping Gavi and the countries it supports to confidently identify and effectively immunise children, no matter where they live.”

Working in partnership with interested Ministries of Health, Gavi and Philips will bring together a multidisciplinary team of clinicians, researchers, designers and digital experts to collaborate on developing a shared vision and plan, tailored to local needs. Philips will leverage its HealthSuite Labs methodology to co-design, prototype and apply new technologies to improve service outreach and enable accurate bottom-up forecasting of immunisation needs. In addition, Philips and Gavi aim to develop data-driven feedback mechanisms to help improve decision making and identify the children that would benefit from vaccination.

Americas region first in world to eliminate measles

The Region of the Americas is the first in the world to have eliminated measles, a viral disease that can cause severe health problems, including pneumonia, blindness, brain swell-

ing and even death. This achievement culminates a 22-year effort involving mass vaccination against measles, mumps and rubella throughout the Americas.

The declaration of measles’ elimination was made by the International Expert Committee for Documenting and Verifying Measles, Rubella, and Congenital Rubella Syndrome Elimination in the Americas. The announcement came during the 55th Directing Council of the Pan American Health Organization/World Health Organization (PAHO/WHO).

Measles is the fifth vaccine-preventable disease to be eliminated from the Americas, after the regional eradication of smallpox in 1971, poliomyelitis in 1994, and rubella and congenital rubella syndrome in 2015.

“This is a historic day for our region and indeed the world,” said PAHO/WHO Director Carissa F. Etienne. “It is proof of the remarkable success that can be achieved when countries work together in solidarity towards a common goal. It is the result of a commitment made more than two decades ago, in 1994, when the countries of the Americas pledged to end measles circulation by the turn of the 21st century.”

Before mass vaccination was initiated in 1980, measles caused nearly 2.6 million annual deaths worldwide. In the Americas, 101,800 deaths were attributable to measles between 1971 and 1979. A cost-effectiveness study on measles elimination in Latin America and the Caribbean has estimated that with vaccination, 3.2 million measles cases will have been prevented in the Region and 16,000 deaths between 2000 and 2020.

“This historic milestone would never have been possible without the strong political commitment of our Member States in ensuring that all children have access to life-saving vaccines,” Etienne continued. “It would not have been possible without the generosity and commitment of health workers and volunteers who have worked so hard to take the benefits of vaccines to all people, including those in vulnerable and hard-to-reach communities. Indeed it would not have been possible without the strong leadership and coordination pro-

vided by PAHO, Regional Office for the Americas of WHO.”

As a result of global measles elimination efforts, only 244,704 measles cases were reported worldwide in 2015, representing a significant decline from earlier years. However, more than a half of these reported cases were notified in Africa and Asia.

World leaders commit to tackling antimicrobial resistance

For the first time, world leaders at the United Nations have committed to taking a broad, coordinated approach to address the root causes of antimicrobial resistance (AMR) across multiple sectors, especially human health, animal health and agriculture. This commitment signals an unprecedented level of attention to curb the spread of infections that are resistant to antimicrobial medicines.

This is only the fourth time a health issue has been taken up by the UN General Assembly (the others were HIV, noncommunicable diseases, and Ebola). The high-level meeting was convened by the President of the 71st session of the UN General Assembly, H.E. Peter Thomson.

“Antimicrobial resistance threatens the achievement of the Sustainable Development Goals and requires a global response,” Thomson said. “Member States have agreed upon a strong political declaration that provides a good basis for the international community to move forward. No one country, sector or organisation can address this issue alone.”

Countries reaffirmed their commitment to develop national action plans on AMR, based on the *Global Action Plan on Antimicrobial Resistance* — the blueprint for tackling AMR developed in 2015 by the World Health Organization (WHO) in coordination with the Food and Agriculture Organization of the United Nations (FAO) and the World Organisation for Animal Health (OIE). Such plans are needed to understand the full scale of the problem and stop the misuse of antimicrobial medicines in human health, animal health and agriculture. Leaders recognized the need for stronger systems to monitor

The commitments made must now be translated into swift, effective, lifesaving actions across the human, animal and environmental health sectors. We are running out of time.

drug-resistant infections and the volume of antimicrobials used in humans, animals and crops, as well as increased international cooperation and funding.

They pledged to strengthen regulation of antimicrobials, improve knowledge and awareness, and promote best practices — as well as to foster innovative approaches using alternatives to antimicrobials and new technologies for diagnosis and vaccines.

Dr Margaret Chan, Director-General of WHO, said: “Antimicrobial resistance poses a fundamental threat to human health, development, and security. The commitments made must now be translated into swift, effective, lifesaving actions across the human, animal and environmental health sectors. We are running out of time.”

Common and life-threatening infections like pneumonia, gonorrhoea, and post-operative infections, as well as HIV, tuberculosis and malaria are increasingly becoming untreatable because of AMR. Left unchecked, AMR is predicted to have significant social, health security, and economic repercussions that will seriously undermine the development of countries.

The high levels of AMR already seen in the world today are the result of overuse and misuse of antibiotics and other antimicrobials in humans, animals (including farmed fish), and crops, as well as the spread of residues of these medicines in soil, crops and water. Within the broader context of AMR, resistance to antibiotics is considered the greatest and most urgent global risk requiring international and national attention.

Breakthrough in analytical sciences could lead to medical revolution

Pharmaceutical research could be quicker and more precise, thanks to an innovative breakthrough in the analytical sciences

from the University of Warwick.

Professor Peter O'Connor and Dr Maria van Agthoven in the Department of Chemistry have invented a device which makes 2D mass spectrometry — an effective process for analysing and sequencing proteins — widely accessible for the first time.

This could lead to a revolution in the pharmaceutical and biomedical communities, enabling researchers and companies to produce data-driven results on how protein molecules function, more easily and cheaply.

2D mass spectrometry allows chemists to explore the elemental composition and structure of a molecule by breaking it apart, and analysing its fragmented pieces — measuring mass, and gathering data on how the whole molecule functions and interacts with its environment.

High numbers of molecules can be experimented on at the same time in this way, as the various fragments of different broken molecules can be modulated at the same frequencies as the molecule from which they originated.

Professor O'Connor and Dr van Agthoven have patented an instrument with which 2D Mass spectrometry can be performed using a linear ion trap — this is a cheaper, smaller, and much more accessible option than was previously available.

The device can be added onto existing MS instruments as well as being bought with new instruments.

The process is currently undertaken using large, expensive machinery, which makes it a relatively exclusive scientific activity. However, the new invention is opening up the technique to a much wider market.

Mass spectrometry produces precise results during protein sequencing, and this type of data-driven biology will produce quicker, better results than are currently obtained in pharmaceutical and biomedical research.

Dr van Agthoven comments that the breakthrough could have numerous and varied applications: “Two-dimensional mass spectrometry has the potential to exponentially increase our knowledge in all areas, from biochemistry to food safety and environmental chemistry.”



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When an international academic center approached the University of Chicago Medicine (UCM) for guidance, we sent a multidisciplinary team of experts to advise the hospital on how to improve its health care service delivery, operations and training programs. Katherine Pakieser-Reed, PhD, RN, executive director of the Center for Nursing Professional Practice and Research, reviewed the institution's nursing practices and provided a set of recommendations that included operational improvements as well as customized training programs in areas such as preventing pressure ulcers. Gary Lennon, UCM's director of Supply Chain Performance and Analytics, brought to the project his business savvy on how to contain costs and improve efficiency in the management of materials and supplies. And Dr. Aasim Padela, an Emergency Medicine faculty member, reviewed the hospital's Emergency Department operations and educational programs and suggested improvements in clinical care processes and residency and fellowship training.

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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Vital bowel cancer treatment technology secures funding

A project to develop a revolutionary new bowel cancer surgery tool that will enable surgeons to carry out operations with far greater precision than ever before has received £628,000 (about US\$783,000) in funding. Once developed, the new technology will significantly outperform conventional, electric-based tools that are currently being used in bowel surgery.

Heriot-Watt University and a consortium of academic and industry organisations received the three-year grant from the Engineering and Physical Sciences Research Council (EPSRC) through the Healthcare Impact Partnership scheme.

The aim of the grant is to allow the team to develop a working prototype of a device that combines optical fibres, which have a diameter like that of a human hair, with laser technology and a new optical imaging agent (EMI-137) that detects and images cancerous cells within the bowel.

At present, surgeons are hindered by a lack of access and visibility in the complex folds within the bowel, and which can lead to damage to surrounding tissue and create serious complications such as bowel perforation during an operation.

Currently, the most commonly used surgical method is electro-cautery which uses an electric current to essentially heat the tissue. This is much less precise than the latest technology being developed because it will be highly flexible and open new routes for minimally invasive surgery, overcoming many of the risks typically associated with electro-cautery.

To exploit these technological and clinical advances, the consortium has established a Healthcare Partnership. The ability to realise the full potential of these flexible fibres, and create a novel steerable surgical tool guided by fluorescent optical imaging agents, is only possible by bringing together a unique combination of expertise. This highlights the support of such a focussed EPSRC funding scheme, which is critical in the development of new, life-saving, surgical technologies.

The consortium, led by Dr Jon Sheph-

ard of Heriot-Watt University, an expert in the use of lasers in medicine, includes Edinburgh Molecular Imaging Ltd, experts in the discovery and development of optical imaging agents, with clinical expertise provided by Professor David Jayne from the NIHR Healthcare Technologies Co-operative based at the University of Leeds.

Commenting on the development Dr Jon Shephard said: "In its present state, the surgical tools and medical technology available to perform bowel cancer operations make it hard for physicians to navigate around the organ and identify tumours. This EPSRC funding will allow us to create a steerable surgical tool guided by fluorescent molecular probes, improving the likelihood patients will be treated successfully and minimising the risks of the operation.

"We have formed an excellent partnership working across the project, including experts in high-power laser applications, surgical technologies and molecular imaging. I am confident that we will be able to further develop the technology and improve the life-saving colorectal surgical procedure, which in turn will become transferable to other life-threatening conditions."

Call to invest in creation of health sector jobs

The Presidents of France and South Africa have called for urgent investments globally to create new jobs in the health sector in order to prevent a projected shortfall of 18 million health workers primarily in low- and lower-middle-income countries, and help countries to maximize the social and economic benefits of increased health employment.

The High-Level Commission on Health Employment and Economic Growth, chaired by François Hollande, President of France, and Jacob Zuma, President of South Africa, delivered its final report and recommendations to United Nations Secretary General Ban Ki-moon on the sidelines of the UN General Assembly in New York.

The Commission concluded that investing in the health workforce is needed to make progress towards the Sustainable Development Goals, including gains in health, global security and inclusive eco-

nomics growth. The commission made 10 recommendations for realising those gains, through appropriate investments in health employment that can power economies, move countries closer to universal health coverage and act as a bulwark against outbreaks such as Ebola.

Ageing populations and increasing rates of non-communicable diseases are projected to generate demand for 40 million new health workers worldwide by 2030, which would represent a doubling of the current global health workforce. But most of those jobs will be created in the wealthiest countries. Without action there will be a shortfall, primarily in low- and lower-middle-income countries, of 18 million health workers needed to achieve and sustain universal health coverage.

Mounting evidence shows that investments in the health sector pay handsome dividends. The returns on investment in health are estimated to be 9 to 1, and around one quarter of growth between 2000 and 2011 in low-income and middle-income countries is estimated to have resulted from improvements to health. Investing in skills and expanding health employment will also contribute to the economic empowerment of women and youth.

"For too long countries have seen health workers as just another cost to be managed, instead of an investment with a triple return for health, economic growth and global health security," said Dr Margaret Chan, Director-General of the World Health Organization.

The need for action is urgent. The Commission calls for immediate actions by March 2018 to secure commitments and accountability for accelerated health workforce investments. In response to the Commission's request, the Vice-Chairs of the Commission from WHO, ILO and OECD will convene all relevant stakeholders by the end of 2016 to develop a five-year implementation plan for the 10 recommendations.

"The report provides solid evidence that investing in the health economy and progressing towards universal health coverage can strengthen economic growth and make it more inclusive by generating decent jobs

in a wide range of occupations,” said Guy Ryder, Director-General of the International Labour Organization. “It offers practical proposals for the implementation of the 2030 Agenda, particularly Sustainable Development Goal 3 on healthy lives and well-being for all at all ages, and goal 8 on inclusive growth and decent work.”

Health is a major and growing source of jobs. Across the OECD, employment in health and social work grew by 48 per cent between 2000 and 2014, while jobs in industry and agriculture declined.

New global initiative will engage 30 cities by 2030 to close mental health gap

King’s College London is joining a major new initiative aiming to reduce the mental health gap by engaging global and community leaders across private, public and philanthropic organisations.

Launched in September at the Clinton Global Initiative (CGI) Annual Meeting in New York, “mental health now” or “mhNOW” is an unprecedented challenge to cities around the world to close the global mental health treatment gap by catalysing and networking collective actions among leaders in every sector.

The group of over 30 organisations includes King’s College London, BasicNeeds, Grand Challenges Canada, Harvard T.H. Chan School of Public Health, International Medical Corps, Johnson & Johnson, National Institute of Mental Health, Orygen Center of Excellence in Youth Mental Health, StrongMinds, Verily Alphabet, the World Bank, and the World Psychiatric Association, among others.

The mental health gap is one of the world’s most devastating and under-resourced problems, affecting more than 450 million people worldwide and stretching far beyond the narrow boundaries of health. Mental illness will make up more than half of the economic burden of disease over the next two decades – more than cancer, diabetes, and chronic respiratory diseases combined – and the global cost of all mental disorders combined is estimated to reach \$6 trillion by 2030. Additionally, mental disorders are a challenge for youth – suicide is a top-three cause of death among youth worldwide, and 90% of children who die by suicide have a mental illness.

Because the effects of mental illness touch livelihoods, productivity, and even whole economies, mhNOW is taking a cross-sector and city-driven approach to close the mental health gap. Cities – with their inherent networks, density, creativity and entrepreneurial capacity – bear the highest burden of mental health but also have the highest potential to achieve meaningful mental health impact.

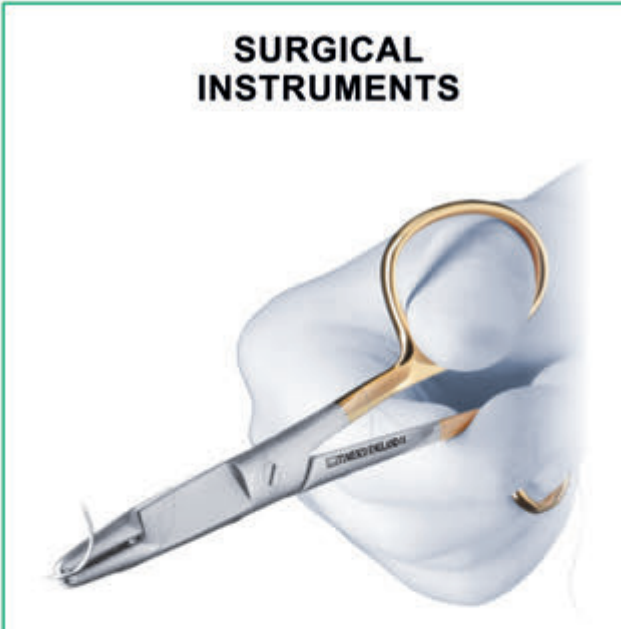
mhNOW will engage 30 cities by 2030, mobilising and channeling support to exceptional city projects that address mental health by providing resources, recognition, and technical assistance for outstanding initiatives in three target areas: (1) scaling local evidence-based innovative programs; (2) mobilising youth leadership; and (3) improving the evidence base for the return on investment in mental health using city-level and global data indicators.

Professor Graham Thornicroft from the Institute of Psychiatry, Psychology & Neuroscience (IoPPN) is leading the King’s College London group which is evaluation partner for the mhNOW consortium. He said: “mhNOW is a bold new partnership going

well beyond previous initiatives in this field. We aim to achieve transformational change by bringing together groups which have not previously been active in the mental health field, working together to increase access to treatment for people with mental illness in many of the world’s greatest cities, by mobilising young people as agents of change. King’s will play a vital role by assessing the impact of this ambitious global programme.”

“Mental illness is humanity’s largest burden – one in four of us will experience mental illness sometime in our lives, and in developing countries, over 90% of people with mental illness receive no treatment,” said Chris Underhill, co-lead of mhNOW and founder of BasicNeeds. “The good news is that proven strategies for cost-effective and high-quality mental health treatment exist – we just need to activate them. This new initiative will empower cities to spark that action on mental health to close the gap.”


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Extreme temperatures may increase preterm birth risk

Extreme hot or cold temperatures during pregnancy may increase the risk of preterm birth, according to study by researchers at the US National Institutes of Health.

The study authors found that extremes of hot and cold during the first seven weeks of pregnancy were associated with early delivery. Women exposed to extreme heat for most of their pregnancies also were more likely to deliver early.

The researchers found more consistent associations with early delivery after exposure to extreme heat than to extreme cold weather. They theorized that, during cold spells, people are more likely to seek shelter and so could more easily escape the cold's effects. But during extreme heatwaves, people are more likely to endure the temperature, particularly when the cost of or access to air conditioning is an impediment.

The study was published in *Environmental Health Perspectives*.

"Our findings indicate that it may well be prudent to minimize the exposure of pregnant women to extremes in temperature," said the study's senior author, Pauline Mendola, Ph.D., an epidemiologist in the Division of Intramural and Population Health Research at the NIH's Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD).

A pregnancy is considered full term at between 39 and 40 weeks. Preterm birth occurs before 37 weeks of pregnancy and increases the risk for infant death and long term disability. It is unknown why extremes of hot or cold might influence preterm birth risk. However, the researchers theorize that the stress of temperature extremes could hinder the development of the placenta or alter blood flow to the uterus, both of which could potentially lead to early labour.

To conduct the study, the researchers linked electronic medical records from 223,375 births at 12 clinical centres throughout the United States to hourly temperature records for the region surrounding each centre. The researchers noted that what constitutes a hot or cold

temperature varies from person to person and place to place. To compensate for local climate variability and personal susceptibility, the researchers evaluated temperatures in the surrounding regions. They defined extreme cold temperatures as below the 10th percentile of average temperatures, and defined extreme heat as above the 90th percentile.

The researchers found that women who experienced extreme cold for the first seven weeks of their pregnancies had a 20% higher risk for delivering before 34 weeks of pregnancy, a nine percent increased risk for delivering from 34-36 weeks, and a three percent increased risk for delivering in weeks 37 and 38. Women whose first seven weeks of pregnancy coincided with extreme heatwaves had an 11% increase in risk before 34 weeks, and a four percent increased risk at 37 to 38 weeks.

Exposure to extreme heat during weeks 15-21 increased the risk for delivery at 34 weeks and at 34-36 weeks by 18 percent and for delivery from 37 to 39 weeks by four percent. Hot exposures during weeks 8-14 increased the risk for birth at 37 to 38 weeks by four percent.

Overall, exposure to extreme heat for the duration of pregnancy was associated with increases in risk for delivery at 34 weeks and 36-38 weeks by 6 to 21%.

An increase in the number of extreme hot days due to climate change could lead to increases in the preterm birth rate, the authors wrote. The authors added that their findings underscore the need for health professionals and policy makers to devise interventions for minimizing pregnant women's exposure to extreme temperatures. The authors also called for more research to understand how temperature extremes might increase preterm birth risk.

Morning sickness linked to lower risk of pregnancy loss

A new analysis by researchers at the US National Institutes of Health has provided the strongest evidence to date that nausea and vomiting during pregnancy is associated with a lower risk of miscarriage in pregnant women. The study, appearing in

JAMA Internal Medicine, was conducted by researchers at NIH's Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD) and other institutions.

Nausea and vomiting that occurs in pregnancy is often called "morning sickness", as these symptoms typically begin in the morning and usually resolve as the day progresses. For most women, nausea and vomiting subside by the 4th month of pregnancy. Others may have these symptoms for the duration of their pregnancies. The cause of morning sickness is not known, but researchers have proposed that it protects the foetus against toxins and disease-causing organisms in foods and beverages.

"It's a common thought that nausea indicates a healthy pregnancy, but there wasn't a lot of high-quality evidence to support this belief," said the study's first author, Stefanie N. Hinkle, Ph.D, a staff scientist in NICHD's Epidemiology Branch. "Our study evaluates symptoms from the earliest weeks of pregnancy, immediately after conception, and confirms that there is a protective association between nausea and vomiting and a lower risk of pregnancy loss."

For their study, Dr Hinkle and her colleagues analysed data from the Effects of Aspirin in Gestation and Reproduction (EAGeR) trial in which researchers tested whether taking daily low-dose aspirin prevents women who experienced one or two prior pregnancy losses from experiencing a future loss.

The authors looked at data from all the women in the study who had a positive pregnancy test. The women kept daily diaries of whether they experienced nausea and vomiting in the 2nd through the 8th week of their pregnancies and then responded to a monthly questionnaire on their symptoms through the 36th week of pregnancy. The study authors noted that most previous studies on nausea and pregnancy loss were not able to obtain such detailed information on symptoms in these early weeks of pregnancy. Instead, most of studies had relied on the women's recollection of symptoms much later in pregnancy or after they had experienced a pregnancy loss.



In the EAGeR trial, a total of 797 women had positive pregnancy tests, with 188 pregnancies ending in loss. By the 8th week of pregnancy, 57.3% of the women reported experiencing nausea and 26.6% reported nausea with vomiting. The researchers found that these women were 50 to 75% less likely to experience a pregnancy loss, compared to those who had not experienced nausea alone or nausea accompanied by vomiting.

New treatment strategy could cut Parkinson's Disease off at the pass

Researchers at Johns Hopkins report they have identified a protein that enables a toxic natural aggregate to spread from cell to cell in a mammal's brain – and a way to block that protein's action. Their study in mice and cultured cells suggests that an immunotherapy already in clinical trials as a cancer therapy should also be tested as a way to slow the progress of Parkinson's disease, the researchers say.

A report on the study appears 30 September 2016 in the journal *Science*.

Ted Dawson, M.D., Ph.D., director of the Institute for Cell Engineering at the Johns Hopkins University School of Medicine and one of the study's leaders, says the new findings hinge on how aggregates of α -synuclein protein enter brain cells. Abnormal clumps of α -synuclein protein are often found in autopsies of people with Parkinson's disease and are thought to cause the death of dopamine-producing brain cells.

A few years ago, Dawson says, a researcher at Goethe University in Germany published evidence for a novel theory that Parkinson's disease progresses as α -synuclein aggregates spread from brain cell to brain cell, inducing previously normal α -synuclein protein to aggregate, and gradually move from the "lower" brain structures responsible for movement and basic functions to "higher" areas associated with processes like memory and reasoning. "There was a lot of skepticism, but then other labs showed α -synuclein might spread from cell to cell," Dawson says. Intrigued, his research group began working with those of Valina Dawson, Ph.D., professor of neurology, and Han Seok Ko, Ph.D., assistant professor of neurology, to investigate how the aggregates enter cells.

The researchers knew they were looking for a certain kind of protein called a transmembrane receptor, which is found on the outside of a cell and works like a lock in a door, admitting only proteins with the right "key". They first found a type of cells α -synuclein aggregates could not enter – a line of human brain cancer cells grown in the laboratory. The next step was to add genes for transmembrane receptors one by one to the cells and see whether any of them allowed the aggregates in. Three of the proteins did, and one, LAG3, had a heavy preference for latching on to α -synuclein aggregates over nonclumped α -synuclein.

The team next bred mice that lacked the gene for LAG3 and injected them with α -synuclein aggregates. "Typical mice develop Parkinson's-like symptoms soon after they're injected, and within

six months, half of their dopamine-making neurons die," Dawson says. "But mice without LAG3 were almost completely protected from these effects." Antibodies that blocked LAG3 had similar protective effects in cultured neurons, the researchers found.

"We were excited to find not only how α -synuclein aggregates spread through the brain, but also that their progress could be blocked by existing antibodies," says Xiaobo Mao, Ph.D., a research associate in Dawson's laboratory and first author on the study.

Dawson notes that antibodies targeting LAG3 are already in clinical trials to test whether they can beef up the immune system during chemotherapy. If those trials demonstrate the drugs' safety, the process of testing them as therapeutics for Parkinson's disease might be sped up, he says.

For now, the research team is planning to continue testing LAG3 antibodies in mice and to further explore LAG3's function.

Parkinson's disease gradually strips away motor abilities, leaving people with a slow and awkward gait, rigid limbs, tremors, shuffling and a lack of balance. Its causes are not well-understood.

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Precision medicine trial first of its kind to show benefit to patients

A clinical trial (MOSCATO 01) for types of advanced cancer is the first of its kind to show that precision medicine – or tailoring treatment for individual people – can slow down the time it takes for a tumour to grow back, according to research presented at the Molecular Analysis for Personalized Therapy (MAP) conference in London in September.

Results from the trial, which took place at the Gustave Roussy Cancer Campus in Paris, found that 199 out of 1110 patients with advanced cancer, who had their genes mapped and their treatment tailored, had around 30% longer before their cancer started growing again compared to any of the previous therapies the patients had tried. This ranged from between five and 32 months.

This trial involved patients who had no other treatment options left and who had already tried three or more cancer therapies. The team found potential faulty molecules to target for 411 of these patients and experimental drugs to hit the targets for 199 of these patients.

The patients on this trial had diverse types of advanced cancer including lung, breast, head and neck, prostate, bladder, bowel and stomach cancer.

The MAP conference is a joint initiative between Cancer Research UK, UNICANCER and ESMO.

Professor Jean Charles Soria, principal investigator of the trial from the Gustave Roussy Cancer Campus, said: “This is the first precision medicine trial to show that analyzing a person’s DNA improves treatment options for patients with late stage cancer. And these results are particularly exciting because in some cases we were testing experimental drugs, and found that we could slow down the growth of tumours in around one in five patients with advanced cancer.”

Dr Christophe Massard, head of the early drug development multidisciplinary committee at Gustave Roussy, said: “The great thing about this is that it’s not just for one type of cancer – patients with many different types of cancer could benefit from this in the future.”

Dr Rowena Sharpe, head of precision

medicine at Cancer Research UK, said: “This is an exciting time for precision medicine and personalized treatment. It’s fantastic to see continued effort going into this area and it’s important that we make the most of the data that we already have. The MAP meeting brings together expertise from across the globe to find the best ways to improve precision medicine programs for cancer patients.”

Sixth sense may be more than just a feeling

With the help of two young patients with a unique neurological disorder, an initial study by scientists at the National Institutes of Health suggests that a gene called PIEZO2 controls specific aspects of human touch and proprioception, a “sixth sense” describing awareness of one’s body in space. Mutations in the gene caused the two to have movement and balance problems and the loss of some forms of touch. Despite their difficulties, they both appeared to cope with these challenges by relying heavily on vision and other senses.

“Our study highlights the critical importance of PIEZO2 and the senses it controls in our daily lives,” said Carsten G. Bönnemann, M.D., senior investigator at the US NIH’s National Institute of Neurological Disorders and Stroke (NINDS) and a co-leader of the study published in the *New England Journal of Medicine*. “The results establish that PIEZO2 is a touch and proprioception gene in humans. Understanding its role in these senses may provide clues to a variety of neurological disorders.”

Dr Bönnemann’s team uses cutting edge genetic techniques to help diagnose children around the world who have disorders that are difficult to characterize. The two patients in this study are unrelated, one nine and the other 19 years old. They have difficulties walking; hip, finger and foot deformities; and abnormally curved spines diagnosed as progressive scoliosis.

Working with the laboratory of Alexander T. Chesler, Ph.D., investigator at NIH’s National Center for Complementary and Integrative Health (NCCIH), the researchers discovered that the patients have mutations in the PIEZO2 gene that appear to block the normal production or

activity of Piezo2 proteins in their cells. Piezo2 is what scientists call a mechanosensitive protein because it generates electrical nerve signals in response to changes in cell shape, such as when skin cells and neurons of the hand are pressed against a table. Studies in mice suggest that Piezo2 is found in the neurons that control touch and proprioception.

“As someone who studies Piezo2 in mice, working with these patients was humbling,” said Dr Chesler. “Our results suggest they are touch-blind. The patient’s version of Piezo2 may not work, so their neurons cannot detect touch or limb movements.”

Further examinations at the NIH Clinical Center suggested the young patients lack body awareness. Blindfolding them made walking extremely difficult, causing them to stagger and stumble from side to side while assistants prevented them from falling. When the researchers compared the two patients with unaffected volunteers, they found that blindfolding the young patients made it harder for them to reliably reach for an object in front of their faces than it was for the volunteers. Without looking, the patients could not guess the direction their joints were being moved as well as the control subjects could.

The patients were also less sensitive to certain forms of touch. They could not feel vibrations from a buzzing tuning fork as well as the control subjects could. Nor could they tell the difference between one or two small ends of a calliper pressed firmly against their palms. Brain scans of one patient showed no response when the palm of her hand was brushed.

Nevertheless, the patients could feel other forms of touch. Stroking or brushing hairy skin is normally perceived as pleasant. Although they both felt the brushing of hairy skin, one claimed it felt prickly instead of the pleasant sensation reported by unaffected volunteers. Brain scans showed different activity patterns in response to brushing between unaffected volunteers and the patient who felt prickliness.

Despite these differences, the patients’ nervous systems appeared to be developing normally. They were able to feel pain, itch, and temperature normally; the nerves



in their limbs conducted electricity rapidly; and their brains and cognitive abilities were similar to the control subjects of their age.

“What’s remarkable about these patients is how much their nervous systems compensate for their lack of touch and body awareness,” said Dr Bönnemann. “It suggests the nervous system may have several alternate pathways that we can tap into when designing new therapies.”

Previous studies found that mutations in PIEZO2 may have various effects on the Piezo2 protein that may result in genetic musculoskeletal disorders, including distal arthrogyriposis type 5, Gordon Syndrome, and Marden-Walker Syndrome. Drs Bönnemann and Chesler concluded that the scoliosis and joint problems of the patients in this study suggest that Piezo2 is either directly required for the normal growth and alignment of the skeletal system or that touch and proprioception indirectly guide skeletal development.

“Our study demonstrates that bench and bedside research are connected by a two-way street,” said Dr Chesler. “Results from basic laboratory research guided our examination of the children. Now we can take that knowledge back to the lab and use it to design future experiments investigating the role of PIEZO2 in nervous system and musculoskeletal development.”

● doi: 10.1056/NEJMoa1602812

Study finds key to nerve regeneration

Researchers at the University of Wisconsin-Madison have found a switch that redirects helper cells in the peripheral nervous system into “repair” mode, a form that restores damaged axons.

Axons are long fibres on neurons that transmit nerve impulses. The peripheral nervous system, the signalling network outside the brain and spinal cord, has some ability to regenerate destroyed axons, but the repair is slow and often insufficient.

The new study suggests tactics that might trigger or accelerate this natural regrowth and assist recovery after physical injury, says John Svaren, a professor of comparative biosciences at the UW-Madison School of Veterinary Medicine. The finding may also apply to genetic ab-

normalities such as Charcot-Marie-Tooth disease or nerve damage from diabetes.

Svaren, senior author of a report published 30 August 2016 in *The Journal of Neuroscience*, studied how Schwann cells, which hug axons in the peripheral nervous system, transform themselves to play a much more active and “intelligent” role after injury.

Schwann cells create the insulating myelin sheath that speeds transmission of nerve impulses. In the repair mode, Schwann cells form a fix-up crew that adds house cleaning and stimulation of nerve regrowth to the usual insulating job.

Svaren and his graduate student, Joseph Ma, compared the activation of genes in Schwann cells in mice with intact or cut axons. “We saw a set of latent genes becoming active, but only after injury,” says Svaren, “And these started a program that places the Schwann cells in a repair mode where they perform several jobs that the axon needs to regrow.”

In the repair mode, but not in the normal one, Schwann cells start cleaning house, helping to dissolve myelin, which is essential for proper functioning but ironically deters regeneration after injury. “If you invite Schwann cells to a party,” says Svaren, “they will clean up the bottles and wash your dishes before they leave the house.”

This cleanup must happen within days of the injury, says Svaren, who directs the cellular and molecular neuroscience core at the Waisman Center on the UW-Madison campus.

The Schwann cells also secrete signals that summon blood cells to aid the cleanup, and they map out a pathway for the axon to regrow. Finally, they return to the insulator role to grow a replacement myelin sheath on the regenerated axon.

Unexpectedly, the Schwann’s transition into the repair form did not entail a reversion to a more primitive form, but rather was based on a change in the regulation of its genes. “Almost every other nervous-system injury response, especially in the brain, is thought to require stem cells to repopulate the cells, but there are no stem cells here,” Svaren says. “The Schwann cells are reprogramming themselves to set up the injury-repair program. We are starting to see them

as active players with dual roles in protecting and regenerating the axon, and we are exploring which factors determine the initiation and efficacy of the injury program.”

After the human genome was deciphered, epigenetics – the study of gene regulation – has moved to the forefront with the realization that genes don’t matter much until they are switched on, and that genetic switches are the fundamental reason why a skin cell doesn’t look like a nerve cell, and a nerve cell’s functions differently than a white blood cell.

In epigenetics, as elsewhere in biology, processes are often regulated through a balance between “stop” and “go” signals. In the Schwann cell transition, Svaren and Ma identified a system called PRC2 that usually silences the repair program. “This pathway amounts to an on-off switch that is normally off,” Svaren says, “and we want to know how to turn it on to initiate the repair process.”

The nature of the top-level gene-silencing system suggested drugs that might remove the silencing mark from the genes in question, and Svaren says he’s identified an enzyme that may “remove the brakes” and deliberately activate the repair program when needed in response to injury.

Even if the drug tests are promising, years of experiments will be necessary before the system can be tested in people. Furthermore, as Svaren acknowledges, “many factors determine how well an axon can regenerate. I am not saying this single pathway could lead to a cure-all, but we do hope it is an important factor.”

Svaren says it’s not clear how the current finding on peripheral nerves relates to damage to the brain and spinal cord, where a different type of cell cares for neurons. There are some similarities, however. In multiple sclerosis, for example, cleanup must precede the replacement of damaged myelin.

Ultimately, the study could open a new door on regeneration, even beyond one key sector of the nervous system. “We have thought of the Schwann cell as a static entity that was just there to make myelin, but they have this latent program, where they become the first responders and initiate many actions that are required for the axon to regenerate,” Svaren says. MCH



Emergency response and health security top agenda at annual meeting in Cairo

The WHO Eastern Mediterranean Regional Committee held their 63rd annual meeting in Cairo in October. Highlights from the packed agenda included global health security and emergency health response in the region. *Middle East Health* reports.

Health ministers and high-level representatives of the 22 countries and territories of the WHO Eastern Mediterranean Region, partner organizations and civil society met at the 63rd Session of the WHO Eastern Mediterranean Regional Committee in Cairo from 3-6 October.

On the first day, WHO's Regional Director Dr Ala Alwan presented his annual report on the work of WHO in the Eastern Mediterranean Region. The report focuses on developments and actions taken within the context of the five strategic priorities set for the Region in 2012. The priorities are:

- strengthening health systems for universal health coverage
- maternal and child health
- noncommunicable diseases
- health security including communicable diseases, and
- emergency preparedness and response.

The Region is home to 30 million internally displaced people and refugees and over 60 million in dire need of health care. We face a major constraint in the lack of adequate funding to maintain our response and support.

Presenting his report, Dr Alwan said: “The five priorities that we identified five years ago included all health-related issues in the Millennium Development Goals, led by the United Nations to boost economic and social development.

“We are now in the first year of a new 15-year effort to achieve a new set of targets, the Sustainable Development Goals. The health priorities included in the new United Nations goals are much more comprehensive than those of the MDGs and are identical with the five strategic priorities we set for this region in 2012.

“Universal health coverage is at the heart of SDG3 and strengthening health systems towards achieving universal coverage will remain the key pillar of all our work. If we can ensure, together, that everyone, no matter where they live, no matter what their background or income level, has equal access to a minimum standard of health care, not only do we save lives, but we also support productivity of society, and sustainable and equitable development in general. In this context, we have a clear and evidence-based regional framework for action for universal health coverage.”

Dr Alwan highlighted two areas: eradication of poliomyelitis and health security.

Polio

With regards the eradication of polio, he noted that over the past 5 years, real

Deteriorating security

During the opening session, WHO’s Director-General Dr Margaret Chan, in her speech, highlighted the deteriorating security situation which was forcing an increasing number of aid agencies to leave, increasing the burden on WHO and its remaining partners.

“The humanitarian situation in the Eastern Mediterranean Region has deteriorated significantly over the past year. The numbers are staggering.

“At the end of 2015, more than 62 million people affected by emergencies in the region needed access to health services. More than 60% of all refugees and internally displaced persons worldwide originate from this region,” she said.

“The war in Syria has entered its sixth year. Each month, at least 25,000 people suffer conflict-related injuries, creating a tremendous need for health care and trauma care. Civilians on all side must have access to the care they need.

“In Iraq, millions of displaced civilians can find no safe place to stay. WHO is using mobile clinics to extend health care to these fluid populations.

“The health system in Yemen is collapsing. That country has recorded the world’s highest number of deaths and injuries. We need to do our best for the Yemeni people. As the security situation forces more aid agencies to leave, the burden on WHO and remaining partners escalates.

Attacks on hospitals

Dr Chan noted that in the three level 3 emergencies in the region, staff in hospitals that are still able to function are overwhelmed, with caseloads increasing in some areas by more than 200%. We must admire these staff for their courage and tenacity.

“The situation is getting worse, not better. Since the beginning of this year, WHO has recorded hundreds of attacks, including deliberate attacks, on hospitals, health facilities, and health care workers, at a time when they are needed most.

“This must stop. Nothing sets hard-won health gains backwards so



Dr Margaret Chan, WHO Director-General, warns of the deteriorating security in the region, in her speech during the opening session of the WHO Eastern Mediterranean Regional Committee annual meeting.

dramatically as humanitarian crises on this scale. The consequences are felt throughout the region,” Dr Chan said.

“Attention focused on the refugee crisis in Europe often fails to note that the vast majority of people forced to flee their homes are generously being accommodated in your countries.

“WHO staff at all levels of the Organization, together with humanitarian partners, have worked heroically to get essential life-saving medical assistance to many millions of people. I commend them for their courage, their commitment, and their compassion.

“The logistical challenges are immense. Unmet needs are vast. In Iraq, the immunization status of children in Mosul, besieged for two years, is simply unknown. We are doing our best to reach as many children as possible,” Dr Chan said.

“In Syria, many health facilities have no medicines to manage diabetes, let alone heart attacks, strokes, and cancer.

“The issues are highly politicized. I thank Dr Alwan and all EMRO staff for remaining steadfast in your support and neutral in your position. Humanitarian assistance must always be motivated by compassion, not politics.”

progress has been made against polio as the two remaining endemic countries, Afghanistan and Pakistan, put national emergency plans into action. “Although we faced setbacks in some crisis countries as outbreaks occurred in 2013, Member States and partners pulled together in support of massive supplementary immunization campaigns that are today regarded by the international community as a model of successful outbreak control.”

“This year we have seen the outcomes: just 9 cases in Afghanistan and 14 (as at end September)

in Pakistan since January this year and eradication is now in sight,” he remarked.

Health security

Dr Alwan pointed out that several experiences in recent years show how health security in any country is an integral part of national and global security.

“Viruses know no borders. Our emphasis on ensuring the necessary conditions are in place in each country to implement the International Health Regulations proved to be strongly justified in the wake of the Ebola outbreak in west Africa and the subsequent rapid assessments we undertook with each country of their readiness to deal with an imported case. This led us, as a region, to take a major role in the past year in pushing for global harmonization of the independent assessment process and a new globally agreed-upon mechanism, known today as joint external evaluation (JEE).

“I’m pleased to say that process is now firmly in place in the Region, with Pakistan, Qatar, Morocco, Lebanon, Jordan and Bahrain having been among the first to assess their IHR implementation using the JEE, and planning now well ahead for the other Member States of the Region to undertake the evaluation. Once complete each country will have a very clear idea of what needs to be done to protect their population,” he said.

Antimicrobial resistance

Dr Alwan stressed that of particular concern to global health security is the issue of antimicrobial resistance. He noted that the recent UN General Assembly in September, Heads of State and Government recognized the critical importance of addressing antimicrobial



Dr Ala Alwan, WHO Regional Director, Eastern Mediterranean Region

resistance. They committed to develop and implement multisectoral national action plans, programmes and initiatives, in line with the global action plan on antimicrobial resistance. “In our region, we have already put together an operational framework for action, and I look forward to seeing all countries moving ahead with

the agenda, working jointly with the agriculture and animal production sector. It is indeed an urgent issue and one that no country can afford to ignore.”

Dr Alwan emphasised that the rising burden of noncommunicable disease is of great concern in this region, and in particular heart disease, cancer, chronic

Dr Mahmoud Fikri nominated for new Regional Director

Dr Mahmoud M. Fikri was nominated to take the place of Dr Ala Alwan as Regional Director for the Eastern Mediterranean Region during the 63rd Regional Committee meeting. The nomination will be submitted to WHO’s Executive Board which meets in January 2017 when the election for the Regional Director will be conducted. Once officially elected, the new Regional Director will take office on 1 February 2017.

Currently, Dr Fikri is the Adviser

to the Minister of Health of United Arab Emirates, and was previously the Undersecretary for Preventive Medicine and Health Policies Affairs in the Ministry (1995–2013). He served as member of the Board of Directors of the WHO Centre for Health and Development and Research in Japan (Kobe) and a member of the Advisory Board of the Gulf Cooperation Council Health Council to 2005. He was also a member of the WHO Executive Board from 1997 to 2000.

respiratory disease and diabetes which are increasing in epidemic proportions in most countries.


“Our framework for action covers basic, effective and high impact measures, aimed at reducing

the incidence of these diseases and their effects. Despite successes in some countries, implementation of these measures has generally been inadequate and uneven. In this respect, working with officials in government and parliament to put these measures in place is a critical step forward,” he said.

Health emergencies programme

Three countries in the Region – Iraq, Syria and Yemen – are coping with emergency situations at the highest level designated by the United Nations, Level 3. Dr Alwan noted that the impact of these crises on health is catastrophic.

“Despite major operational and financial challenges, in the past year we have provided much support to maintain functionality in health facilities in Iraq, Syria, Yemen and other countries, and we have worked closely with partners to reach as many people as possible with essential health care. We have substantially revised our own response structures and capacity, and will continue to do so. I am confident that the new WHO global health emergencies programme will benefit the Region, in both emergency and outbreak preparedness and response. It is expected to boost the resources available to manage responses on the ground and will enable us to devote more efforts to preparedness,” Dr Alwan said.

“The fact remains that the humanitarian situation is worsening and the Region is home to 30 million displaced [internally displaced people] and refugees and over 60 million in dire need of health care. We face a major constraint in the lack of adequate funding to maintain our response and support to countries which will undoubtedly have an inevitable impact on health equity, in the Region and beyond. But let me take this opportunity to thank our donors for their support and let us hope and pray that solidarity with crisis countries is strengthened and, ultimately, peaceful resolution will prevail. 

92% of world population live with air pollution

A new World Health Organization (WHO) air quality model confirms that 92% of the world's population lives in places where air quality levels exceed WHO limits. Information is presented via interactive maps, highlighting areas within countries that exceed WHO limits.

The situation is even worse in the Eastern Mediterranean Region where the percentage rises to 98%.

“The new WHO model shows countries where the air pollution danger spots are, and provides a baseline for monitoring progress in combatting it,” says Dr Flavia Bustreo, Assistant Director General at WHO.

It also represents the most detailed outdoor (or ambient) air pollution-related health data, by country, ever reported by WHO. The model is based on data derived from satellite measurements, air transport models and ground station monitors for more than 3000 locations, both rural and urban. It was developed by WHO in collaboration with the University of Bath, United Kingdom.

Air pollution's toll on human health

Some 3 million deaths a year are linked to exposure to outdoor air pollution. Indoor air pollution can be just as deadly. In 2012, an estimated 6.5 million deaths (11.6% of all global deaths) were associated with indoor and outdoor air pollution together.

Nearly 90% of air-pollution-related deaths occur in low- and middle-income countries, with nearly two out of three occurring in WHO's South-East Asia and Western Pacific Regions.

Ninety-four per cent are due to noncommunicable diseases – notably cardiovascular diseases, stroke, chronic obstructive pulmonary disease and lung cancer. Air pollution also increases the risks for acute respiratory infections.

“Air pollution continues take a toll on the health of the most vulnerable populations - women, children and the older adults,” adds Dr Bustreo. “For people to be healthy, they must breathe clean air from their first breath to their last.”

Major sources of air pollution include inefficient modes of transport, household fuel and waste burning, coal-fired power plants, and industrial activities. However, not all air pollution originates from human activity. For example, air quality can also be influenced by dust storms, particularly in regions close to deserts.

Improved air pollution data

The model has carefully calibrated data from satellite and ground stations to maximize reliability. National air pollution exposures were analysed against population and air pollution levels at a grid resolution of about 10 km x 10 km.

“This new model is a big step forward towards even more confident estimates of the huge global burden of more than 6 million deaths – one in nine of total global deaths – from exposure to indoor and outdoor air pollution,” said Dr Maria Neira, WHO Director, Department of Public Health, Environmental and Social Determinants of Health. “More and more cities are monitoring air pollution now, satellite data is more comprehensive, and we are getting better at refining the related health estimates.”

Interactive map

The interactive map provides information on population-weighted exposure to particulate matter of an aerodynamic diameter of less than 2.5 micrometres (PM2.5) for all countries. The map also indicates data on monitoring stations for PM10 and PM2.5 values for about 3000 cities and towns.

“Fast action to tackle air pollution can't come soon enough,” adds Dr Neira. “Solutions exist with sustainable transport in cities, solid waste management, access to clean household fuels and cook-stoves, as well as renewable energies and industrial emissions reductions.”



Global ambient air pollution map

<http://maps.who.int/airpollution/>

Yoshinori Ohsumi honoured for discovering mechanisms for autophagy

This year's Nobel Prize in Physiology or Medicine has been awarded to Professor Yoshinori Ohsumi for his discoveries of mechanisms for autophagy – a fundamental process for degrading and recycling cellular components. Ohsumi is from Japan and is currently affiliated to the Tokyo Institute of Technology, Japan.

Autophagy literally means 'self-eating'. This concept emerged during the 1960's, when researchers first observed that the cell could destroy its own contents by enclosing it in membranes, forming sack-like vesicles that were transported to a recycling compartment, called the *lysosome*, for degradation. Difficulties in studying the phenomenon meant that little was known until, in a series of brilliant experiments in the early 1990's, Yoshinori Ohsumi used baker's yeast to identify genes essential for autophagy. He then went on to elucidate the underlying mechanisms for autophagy in yeast and showed that similar sophisticated machinery is used in our cells.

Ohsumi's discoveries led to a new paradigm in our understanding of how the cell recycles its content. His discoveries opened the path to understanding the fundamental importance of autophagy in many physiological processes, such as in the adaptation to starvation or response to infection. Mutations in autophagy genes can cause disease, and the autophagic process is involved in several conditions including cancer and neurological disease.

Breakthrough experiment

Ohsumi had been active in various research areas, but upon starting his own lab in 1988, he focused his efforts on protein degradation in the vacuole, an organelle that corresponds to the lysosome in human cells. Yeast cells are relatively easy to study and consequently they are often used as a model for human cells. They are particularly useful for the identification of genes that are important

in complex cellular pathways. But Ohsumi faced a major challenge; yeast cells are small and their inner structures are not easily distinguished under the microscope and thus he was uncertain whether autophagy even existed in this organism. Ohsumi reasoned that if he could disrupt the degradation process in the vacuole while the process of autophagy was active, then autophagosomes should accumulate within the vacuole and become visible under the microscope. He therefore cultured mutated yeast lacking vacuolar degradation enzymes and simultaneously stimulated autophagy by starving the cells. The results were striking! Within hours, the vacuoles were filled with small vesicles that had not been degraded. The vesicles were autophagosomes and Ohsumi's experiment proved that autophagy exists in yeast cells. But even more importantly, he now had a method to identify and characterize key genes involved in this process. This was a major break-through and Ohsumi published the results in 1992.

Ohsumi then went on to discover the first genes essential for autophagy. In his subsequent series of elegant studies, the proteins encoded by these genes were functionally characterized. The results showed that autophagy is controlled by a cascade of proteins and protein complexes, each regulating a distinct stage of autophagosome initiation and formation.

Autophagy – an essential mechanism in our cells

After the identification of the machinery for autophagy in yeast, a key question remained. Was there a corresponding mechanism to control this process in other organisms? Soon it became clear that virtually identical mechanisms operate in our own cells. The research tools required to investigate the importance of autophagy in humans were now available.


Thanks to Ohsumi and others following in his footsteps, we now know



Professor Yoshinori Ohsumi

that autophagy controls important physiological functions where cellular components need to be degraded and recycled. Autophagy can rapidly provide fuel for energy and building blocks for renewal of cellular components, and is therefore essential for the cellular response to starvation and other types of stress. After infection, autophagy can eliminate invading intracellular bacteria and viruses. Autophagy contributes to embryo development and cell differentiation. Cells also use autophagy to eliminate damaged proteins and organelles, a quality control mechanism that is critical for counteracting the negative consequences of aging.

Disrupted autophagy has been linked to Parkinson's disease, type 2 diabetes and other disorders that appear in the elderly. Mutations in autophagy genes can cause genetic disease. Disturbances in the autophagic machinery have also been linked to cancer. Intense research is now ongoing to develop drugs that can target autophagy in various diseases.

Autophagy has been known for over 50 years but its fundamental importance in physiology and medicine was only recognized after Yoshinori Ohsumi's paradigm-shifting research in the 1990's. For his discoveries, he is awarded this year's Nobel Prize in physiology or medicine. 

رائدة العلوم في العالم العربي متاحة الآن للجميع ..

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لقد كانت مهمتنا دوماً إيجاد سُبُل جديدة ومبتكرة لمشاركة أحدث الاكتشافات في مجال العلوم، وتطوير النقاش بين المجتمع العلمي العالمي. وتُعَدُّ دورية *Nature* الطبعة العربية سواء النسخة الورقية المطبوعة، أو الإلكترونية، أو تطبيق الهواتف الذكية بمنزلة مُنْتَدَاك الخاص لقراءة الأبحاث الرئيسية، ومشاهدتها، والاستماع إليها، والمشاركة فيها.





Credit: Morley Von Sternberg



Credit: Morley Von Sternberg

Cancer Centre Welcome Village

Cancer Centre Radiotherapy Village

£160 million Cancer Centre

A new £160 million (about US\$200 million) Cancer Centre at Guy's Hospital, which has been designed by patients for patients, opened on 26 September.

The new Cancer Centre also brings together treatment and research in an Innovation Hub, which will transform King's College London's translational cancer research programme, enabling scientists to carry out more specialised research on different types of cancer.

Working alongside clinicians, King's researchers will analyse patients' conditions to better predict and monitor responses and assess resistance to treatment, enabling the centre to stratify patients, develop more personalised medicine and help design better therapies and drugs. The Hub will also introduce new treatments through research-led trials, enabling the hospital to increase the number of cancer patients registering for clinical trials and through their hub-based analytics improve the chances of

successful implementation.

The hospital's breast cancer biobank dates back to 1975 and the availability of tissue from this source has been invaluable for many national and international research studies. The volume and ethnic diversity of the patient population means they are uniquely placed to collect data about a range of cancers. The Hub will provide much-needed space and opportunity to consent patients and collect and store samples. Along with gathering more data on breast and prostate cancers, the hospital is expanding their biobank to include tissues from other tumour types where survival rates have remained static for decades: lung, upper-gastrointestinal, and head and neck cancers.

Tumour metastasis is the most common cause of death in cancer patients and there is a need to increase understanding of the genetic changes that program cancer cells to move from the primary tumour site, survive and grow as secondary tumours

in distant organs and gain insight into how these changes induce a permissive environment in which the tumour can thrive. Embedding their research into the patient pathway will enable them to study molecular changes over longer periods of time, to help shape current and future treatments.

Professor Peter Parker, Head of the Division of Cancer Studies at King's College London, says: "Expanding our Experimental Medicine Programme will enable us to grow our capabilities in designing and conducting clinical trials for new treatments.

"Our vision is for the Innovation Hub to cross-fertilise ideas between researchers and clinicians so that potentially impactful discoveries can be advanced rapidly and successful approaches for one cancer type can be tested quickly in others."

Professor Sir Robert Lechler, Vice Principal (Health) of King's College London, and Executive Director of



Credit: David Tett

Cancer Centre outpatient self-check



Credit: Morley Von Sternberg

Cancer Centre Chemotherapy Village

opens at Guy's Hospital

King's Health Partners Academic Health Sciences Centre adds: "Having clinicians and researchers working side by side will allow us to speed up the journey from discoveries in our laboratories and early clinical trials right through to innovative new treatments and therapies in our clinics. By doing this, we will continue to improve the physical and mental health outcomes and experience of cancer care for our patients."

Transforming cancer care

Dr Majid Kazmi, Clinical Director of Cancer Services at Guy's and St Thomas', says: "It is fantastic to welcome the first patients to our new Cancer Centre. [This] is the culmination of more than 10 years of planning and working in partnership with our patients to create a building to transform cancer care."

The new Cancer Centre at Guy's brings together most treatment under one roof – previously cancer care was provided in

13 different locations in eight different buildings on the St Thomas' and Guy's sites.

It is the first cancer centre in Europe to provide radiotherapy treatment above ground level after patients said this would make a huge difference to them.

Largely funded by Guy's and St Thomas' NHS Foundation Trust, the Cancer Centre at Guy's was made possible by a grant of £25 million from Guy's and St Thomas' Charity and a £15 million grant awarded to King's College London from the UK Research Partnership Investment Fund (managed by the Higher Education Funding Council) for the Innovation Hub.

The charity Dimbleby Cancer Care will provide a range of information and support services for cancer patients and their families in the Cancer Centre's Welcome Village, including a drop-in information service, welfare benefits advice, psychological support, complementary therapies, and the

provision of Dimbleby pillows for cancer patients and their families.

Speaking at the opening, Jonathan Dimbleby, Chair of Dimbleby Cancer Care, said: "Our charity has endowed more than £2 million to the new Cancer Centre at Guy's so this is a very exciting day for us. It is wonderful to see the last few years of everyone's hard work come to fruition.

Kieron Boyle, Chief Executive of Guy's and St Thomas' Charity, says: "The opening of the landmark Cancer Centre at Guy's represents a huge leap in the journey to transform cancer treatment, care and research here at Guy's and St Thomas'.

"Having cancer is something one in two of us will face at some point in our lifetime. Our support, and other generous donations, have enabled the Cancer Centre to be equipped with the very latest in technology and brought most cancer services under one roof." MEM



Science begins at the Crick

The first scientists have moved into the new £650 million (about US\$810 million) Francis Crick Institute building in London and are starting work in their purpose-built labs. Next to St Pancras station and the British Library, the Crick will be the biggest biomedical research institute under one roof in Europe.

Research groups will continue moving in each week until the end of the year, as lab space is adapted for each research group. The start of 2017 will see the Francis Crick Institute up and running with all 1250 scientists and 250 other staff moved in and research projects ramping up.

Paul Nurse, Director of the Francis Crick Institute, said: “A remarkable state-of-the-art new home for the Crick has been completed and the occupation by scientists has started. But this is only the beginning. As all our research groups move in over the rest of the year, it will be the discoveries we make here that will establish our place at the forefront of science in London, the UK and worldwide.”

The Crick

Research at the Crick aims to discover how and why disease develops in order to find new ways to prevent, diagnose and treat conditions such as cancer, heart disease and stroke, infections and neurodegenerative conditions like motor neurone disease.

The Crick has been established through the collaboration of six founding partners: the Medical Research Council (MRC), Cancer Research UK, Wellcome, UCL (University College London), Imperial College London and King’s College London.

The institute is bringing scientists together from across disciplines to tackle the pressing health concerns of the 21st century. By being open to collaboration, by training future science leaders and by seeking to improve people’s health and wellbeing, the Crick aims to boost UK science and health and help drive the UK economy.

Professor Edward Byrne AC, President and Principal of King’s College London, says: “As a founding academic partner King’s is delighted to play a key role in this world-leading institute, bringing experts from a wide range of disciplines to work collaboratively under one roof. King’s has an excellent track record in bringing scientists and clinicians together to translate research into innovative treatments as quickly as possible. Our expertise will strengthen further the institute’s ability to bring basic and applied science together with clinical knowledge, to benefit patients across the UK as well as society as a whole.”

The building

The Crick’s building is one of the most complex buildings in London. It has been designed by

architects HOK with PLP Architecture and constructed by Laing O’Rourke. Arup and AKT II were the engineers on the project, with Arup also the project manager. Turner & Townsend were cost consultants on the project and Cordless Consultants have provided IT and AV facilities.

The design, construction and commissioning of the 170m-long building with approaching 1 million square feet of floor space over 12 floors has been a technically challenging undertaking and an engineering project in itself. It required very high specifications to be met for the most sensitive and advanced research equipment to be used – such as high vibration resistance, close temperature control, minimisation of electromagnetic interference and high rates of air change. The building has also been designed to minimise impact on the environment, with solar panels on the roof and its own combined heat and power system.

The approach

On 1 April 2015 the Medical Research Council’s National Institute for Medical Research and Cancer Research UK’s London Research Institute merged to become the Francis Crick Institute. These research groups are being joined by scientists from the university partners (UCL, Imperial and King’s), who bring with them specialist knowledge, skills

and resources across a range of scientific disciplines. In particular, university researchers working in the Crick help add expertise in the physical and clinical sciences.

Collaboration and interdisciplinary working is designed in to the Crick. Research groups from different disciplines and from different original organisations have been given neighbouring lab space. Coupled with lots of open work space, breakout areas and shared core facilities, this means scientists can't help but bump into each other, have conversations and share ideas. It is all expected to lead to the generation of new insight, research directions and innovations.

The new building is equipped with state-of-the-art facilities for biomedical research. Genetics and genomic studies have access to advanced DNA sequencing, while the latest mass spectrometry

equipment allows gene expression, proteins and metabolic pathways to be characterised. Bioinformatics support allows studies involving very large datasets. The robots in the high-throughput screening facility allow tens of thousands of drug candidates to be tested in cells. Electron microscopy, X-ray crystallography and nuclear magnetic resonance suites allow biological structures to be studied in fantastic detail.

Discovery science

The Crick specialises in discovery science: investigating the fundamental biological processes underlying human health and disease. But the increased understanding of these key processes can lead to opportunities to develop novel drugs and innovative new treatments. Translational research – the turning of biological discoveries in the lab into treatments for patients in the clinic – will be a focus for the Crick. For example,

the institute has an ongoing partnership with GSK in which teams of scientists from both organisations work side by side in the lab and benefit from the sharing of ideas and approaches in investigating biological systems.

David Roblin, Chief Operating Officer and Director of Scientific Translation at the Francis Crick Institute, said: “It is tremendous to have reached the point when science is beginning in our glorious new building. It’s been an achievement of many people to this point – in the design, the construction, the fitting out, and the project management of moving in people, equipment and experiments. To do this while also running active research programmes across multiple sites speaks to the skill and effort of our staff and supporters. It gives a sense of what we’ll be able to achieve once we’re all together in our new home.” ■ MPH

New leadless pacemakers overcome lead-related complications



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

In December 2015, a patient at Royal Brompton Hospital was one of the first in the UK to be fitted with an innovative new pacemaker, the Nanostim, which works without leads. Consultant cardiologist and electrophysiologist Dr Tom Wong performed the procedure.

The Nanostim is less than 10% of the size of a conventional pacemaker. It is implanted directly into the heart via a catheter and does not require a pacing lead or a pulse generator pocket (nor scar or lump). The procedure takes less than one hour

and is performed in a cath lab under local anaesthetic. Once inserted, the Nanostim securely nestles inside the heart, sending small pulses of electricity when needed to prompt the heart to beat at a normal rate.

After the procedure, patients without complications will normally be discharged the following day and can return to normal activity within one week.

The pacemaker battery life is at least equivalent to (if not longer lasting than) that of the conventional single chamber pacemakers – with 9 to 13 years of battery life. If the batteries do need to be changed the device can be retrieved and the battery replaced when using the Nanostim system.

Although the incidence of pacemaker complications is relatively low, when complications occur, they typically happen in the pocket where the pacemaker is implanted or with the leads. In up to 1% of patients, the pocket may become infected and in more than 1 in 100 patients, the leads may



Image courtesy of St. Jude Medical ©2016.

move out of place causing complications – these are some of the complications the leadless device overcomes. The Nanostim may provide further benefits in avoiding mobility issues in the shoulder that can be experienced in those that are fitted with a conventional pacemaker.

Dr Tom Wong can advise on patient suitability for leadless pacemakers at all RB&HH Specialist Care locations.

● To refer a patient email: privatepatients@rbht.nhs.uk

World's largest brain imaging study produces exciting results

Data from the world's largest brain and body scanning study has been released.

Kate Wighton of Imperial College, London reports.

Exciting early results from analysing the brain imaging data, alongside thousands of measures of lifestyle, physical fitness, cognitive health and physical measures such as body-mass-index (BMI) and bone density have been published in *Nature Neuroscience*.

The high quality of the imaging data and very large number of subjects allowed researchers to identify more than 30,000 significant associations between the many different brain imaging measures and the non-imaging measures. The findings have now been made available for use by researchers worldwide.

Results included:

- Strong associations between people's cognitive processing speed and markers of the integrity of the brain's "wiring" and the size of brain structures. These effects increased in strength as people aged.

- A negative correlation between brain activity during a simple shape-matching task and intelligence, an effect that didn't relate to participants' age. This might be because the people who scored more highly on the cognitive tests needed to use less of their brain to carry out the task.

- A pattern of strong associations between higher blood pressure, greater alcohol consumption, and several measures that could reflect injury to connections in the brain.

- A separate pattern of correlations, linking intake of alcohol and tobacco and changes in red blood cells and cardiac fitness, to brain imaging signals associated with increased iron deposits in the brain.

- Researchers also unearthed some more complicated patterns of correlation. For example, one pattern links brain imaging to intelligence, level of education, and a set of lifestyle factors that at first appear unrelated – including amount of time spent outdoors. It is plausible that, taken together, these factors create a profile of socio-economic-

status and its relation to the brain.

- However, because UK Biobank is an "observational" study that characterizes a cross-section of individuals, it's not always straightforward to establish which factors cause which, but such results should help scientists to define much more precise questions to address in the future search for ways of preventing or treating brain disease.

UK Biobank will be the world's largest health imaging study. The imaging is funded by the Medical Research Council, Wellcome Trust, and the British Heart Foundation. It was launched in April 2016 after a number of years of planning and consultation with a large number of health and scanning experts. With the ambitious goal of imaging 100,000 existing UK Biobank participants, it is creating the biggest collection of scans of internal organs, to transform the way scientists study a wide range of diseases, including dementia, arthritis, cancer, heart attacks and stroke.

The paper describes the brain imaging part of UK Biobank, led by Professors Steve Smith and Karla Miller from the University of Oxford, and Professor Paul Matthews from Imperial College London.

Professor Miller said: "We are using cutting-edge MRI scans and Big Data analysis methods to get the most comprehensive window into the brain that current imaging technology allows.

"These results are just a first glimpse into this massive, rich dataset that will emerge in the coming years. It is an unparalleled resource that will transform our understanding of many common diseases."

Professor Matthews, Edmond and Lily Safra Chair and Head of Brain Sciences at Imperial, added: "These results are exciting, but merely provide a first hint of what can be discovered with the UK Biobank. This project also is a landmark because of the way it has been done: 500,000 volunteers across the UK are

donating their time to be part of it and more than 125 scientists from across the world contributed to the design of the imaging enhancement alone. Imperial College scientists played a major role in its inception and leadership as part of a team recruited by the UK Biobank from a number of UK universities. This is a wonderful example of 'open science'".


First results

The paper reports the first results from this remarkable data resource, which includes six different kinds of brain imaging done in the 30 minutes that each volunteer is in the brain scanner.

Professor Smith explained: "We have 'structural imaging' – that tells us about brain anatomy – the shapes and sizes of the different parts of the brain. Another kind – 'functional MRI' – tells us about complex patterns of brain activity. Yet another kind – 'diffusion MRI' – tells us about the brain's wiring diagram. The rich and diverse information contained in these scans will reveal how the working of the brain can change with aging and disease; different diseases will best be understood through different combinations of information across these different images."

100,000 participants

UK Biobank has already scanned 10,000 participants, including images of the heart, body, bone and blood vessels in addition to brain scans. This will be by far the largest brain imaging study ever conducted; within another five years UK Biobank will have completed the scanning of 100,000 participants.

One reason for needing such large numbers of participants is to have enough subjects to allow discovery of early, possibly subtle, markers of future disease risk, both for a range of common diseases and for rare neurological disorders like motor neuron disease. 



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UK Pavilion set to showcase ‘the very best of British innovation’

Each year, the Arab Health congress and exhibition attracts a high level of UK clinicians, clinics and healthcare technology companies and Arab Health 2017 is no exception.

Over 100 leading healthcare businesses, renowned hospital groups and esteemed clinicians from world-leading clinics will be amongst the UK delegation travelling to the Middle East to showcase ‘the very best’ of British healthcare.

Organised by the Association of British Healthcare Industries (ABHI) – the industry association for the medical technology sector in the UK – the UK Pavilion will highlight how British developments are transforming the lives of patients and clinicians across the globe.

The centrepiece of the pavilion will be a state-of-the-art operating theatre, equipped with advanced UK technologies. This surgical “stage” will celebrate collaborations between healthcare providers, clinicians and healthcare

technology companies and allow visitors to watch Britain’s best surgeons in action. Confirmed hospitals taking part in the demonstrations include BMI Healthcare, Royal Brompton Hospital and HCA International.

Exhibiting companies on the UK Pavilion will include Owen Mumford, a global manufacturer with over 60 years’ expertise in the development of medical devices. The company prides itself on bringing together research, design expertise and engineering excellence to create products that improve lives and reduce healthcare costs.

Timesco Healthcare, who has been supporting medical professionals with pioneering products for over 50 years will also be exhibiting, along with Durbin, one of the world’s leading specialist medical suppliers.

Pressure ulcer specialist, Rober will also be showcasing their pioneering mattress solutions that cater for a variety of needs

including patients that are immobile, critically ill and bariatric. Their innovative range of mattresses and overlays has been developed in conjunction with clinicians and features clinically proven technology that prevents pressure injuries from developing. The technology also has therapeutic properties that promote the healing of established ulcers.

Edgbaston Medical Quarter

For the first time, the UK Pavilion will welcome the prestigious Edgbaston Medical Quarter (EMQ). Located within the heart of the UK and just one mile from Birmingham city centre, EMQ is a world-class medical and life sciences destination. It boasts over 550 medical companies, a proliferation of over 180 medical organisations, 80 hospitals and specialist care centres, 44 GP clinics and routine care facilities and 23 training facilities. It is also home to 22 life sciences specialisms with active research programmes and is the



‘go to’ destination for more cost effective and rapid clinical trials.

London’s renowned Harley Street Medical Area will be returning to the Middle East for its second year; this time with 20 world-leading clinics and hospital groups. This year’s attendees include the prestigious King Edward VII Hospital, frequented by the British royal family and patronage by Her Majesty the Queen. Isokinetic, an international medical group specialising in the management and recovery of sports injuries and listed as one of the 45 FIFA Medical Centres of Excellence in the world will also be in attendance. As the world’s largest private hospital group, HCA International is also joining the Harley Street Medical Area to showcase their clinical excellence and state-of-the-art facilities.

The UK is also proud to have a number of confirmed speakers presenting at the Arab Health 2017 congress. One of these speakers is the international lead for FC Barcelona’s Sports Science and Health Department and Isokinetic Medical Group, Dr Daniel Medina. Dr Medina will speak about the club’s strategic vision for Innovation and Technology and its contributing role to both success on the field of play and to the development of improved player health across the world.

Speaking about the UK Pavilion, Paul Benton, International Director of the ABHI, said: “We are extremely excited to be travelling to the Middle East, with what is our largest ever delegation of UK exhibitors.”

“The UK is a key player in the drive to improve patient care around the world through the development and implementation of new technologies. We have a vibrant, diverse and highly innovative medical technology industry, which has cemented our reputation as a global leader.”

■ The UK Pavilion will be located in Zabeel Hall 1 and Zabeel Hall 4. The ABHI stand will be located on Z1D30 in Zabeel 1.



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Health reform – new models of care and accelerating technology adoption



By Kevin Kiely Founder & CEO Medilink

Health and Social Care delivery systems globally are faced with common issues; spiralling costs due to increased demand caused by the ageing demographic, an epidemic in long term chronic disease e.g. obesity, diabetes, heart disease and rising patient / citizen expectations. Transforming these systems has become a priority and the direction of travel has generally been to redistribute resources away from the treatment of ill health, to early diagnosis (which avoids the need for more costly later stage intervention), self-management of disease and of course improved health and well-being.

The National Health Service (NHS) in England deals with nearly 1 million patients daily covering everything from antenatal screening, routine screening,

treatments for long-term conditions, transplants, accident & emergency treatment, to end of life care. It has not wavered in its commitment to provide high quality care for all and through ongoing transformation, it is still regarded by many to be the most efficient in the world. However, it recognises the need to evolve to meet new challenges and to adapt to take advantage of the opportunities that science and technology offers.

The *NHS England Five Year Forward View*, published towards the end of 2014 and developed in partnership with major health institutions, patient groups and individual experts, created a collective view on how health and social care delivery needed to change over a five-year period. Central to this plan was:

- i) to galvanise action around national public health issues such as obesity, smoking etc.,
- ii) to enable patients/citizens to take greater control over their own health and
- iii) to break down the barriers in how care is provided between family doctors and hospitals and between physical health and mental health.

New partnerships

Over the last year we have seen progress being made from major new partnerships formed to drive the development of new models of care. For example, 50 'Vanguard' sites have been working on new delivery

systems across, 'acute care collaborations;', 'urgent and emergency care', 'integrated primary and secondary care' and 'multispecialty community providers e.g. moving specialist care out of hospitals into the community. Seven new 'Test Beds' funded by NHS England have been working on the simultaneous development of new innovative technology alongside service transformation.

Another recent programme set to transform healthcare delivery in England from the 'bottom up', thereby reflecting local needs and priorities, is the development of local Sustainability & Transformation Plans (STPs) aggregated into 44 regional footprints across England. The Health and Care organisations within these geographical footprints are working in partnership to secure immediate improvements in integrated delivery but more importantly to drive sustainable transformation in patient experience and health outcomes in the long term.

Perhaps the largest scale development in integration of health delivery in the UK has been with Health Devolution in Manchester. In line with the UK Government's strategy to transfer more powers and responsibilities from National Government to the regions, groundbreaking health devolution plans have given Greater Manchester and local NHS services much more control of the region's £6 billion health and social care budget. There will

major focus on preventing ill health and promoting healthy lifestyles as part of this devolution deal.

Investment

NHS England continues to commit funding to both stimulating solutions to unmet clinical needs – its SBRI Healthcare programme awarded £17.5 million in grants last year, to small / medium sized companies that formed consortia to deliver solutions to unmet clinical need, and at the other end of the continuum, to speeding up the adoption of new innovative technology – in the first round of the new NHS Innovation Accelerator programme, 17 innovators received support to access 345 NHS providers and commissioners and raised £8.9 million in funding.

A new ‘Innovation and Technology tariff’ will remove the need for multiple local price negotiations, and instead guarantee automatic reimbursement when an approved innovation is used, while at the same time allowing NHS England to negotiate national ‘bulk buy’ price discounts on behalf of hospitals, General Practitioners / physicians and patients.

The Medical Research Council (MRC) and Innovate UK (the UK Innovation Agency) have committed significant funds to the Biomedical Catalyst programmer (£180 million over four years) supporting projects that seek to explore the potential of new innovative ideas or to test out such developments in a real world setting, in the areas of:

- i) disease prevention and the proactive management of long term chronic disease
- ii) the earlier or better detection and diagnosis of disease and
- iii) tailored treatments to change the underlying nature of or provide cures for disease.

Catapult Centres

Innovate UK have also invested heavily in Catapult Centres, a series of physical centres where the very best of the UK’s businesses, scientists and engineers work side by side on late-stage research and development – transforming high potential ideas into new products and services to generate economic

growth. Health-related Catapults include the Cell & Gene Therapy Catapult; the Precision Medicine Catapult, the Medicines Discover Catapult and the High Value Manufacturing Catapult which also has health applications. The Catapults provide access to expert technical capabilities, equipment, and other resources required to take innovative ideas from concept to reality.

Research

Perhaps the most attractive features of the UK Health ecosystem is its investment in world class research with the Research Councils having invested £3bn (US\$4.6bn) per year on health research and Research Charities adding another £1b per year. The UK 100,000 Genomes Project, for example, will sequence 100,000 genomes from around 70,000 NHS patients with a rare disease, plus their families, and patients with cancer. The aim is to create a new genomic medicine service for the NHS – transforming the way people are cared for. Patients may be offered a diagnosis where there wasn’t one before. In time, there is the potential of new and more effective treatments.

Technology Enabled Care

Another area that is beginning to transform healthcare delivery is developments in Digital/ Technology Enabled Care (TEC). With the costs of digital technology plummeting, the use of mobile technology (smartphones and

tablets) advancing exponentially, and with an Increasing recognition that TEC can provide patients / citizens, carers, and healthcare professionals with data more easily, whilst improving health outcomes. TEC is considered to be key to any future integrated health and care system. The innovation infrastructure referred to earlier is nurturing a large number of digital solutions with the advantage of being tested in real world health situations in NHS England.

The UK Government has created a positive environment for life science investment in the UK, with the Patent Box initiative allowing companies to pay only 10% corporation tax on profits attributable to qualifying patents. Its R&D tax credit scheme provides small to medium sized companies with relief on qualifying R&D expenditure, and with its major investment in clinical trials, they are now easier to access and quicker to deliver.

NHS England have embarked on a journey to transform health and social care delivery through piloting ‘at scale’ new models of care which break down traditional barriers between care providers, provide the individual citizen with greater control of their own care, and tackle ‘head on’ public health issues such as obesity and smoking. Significant investment continues to be made in life science research and, with accelerating technology development and adoption in the NHS, developments in Technology Enabled Care and Genomic Medicine are set to transform future healthcare provision. MHP

Medilink UK

Medilink UK, the largest representative body for the UK Life Science Industry (Med Tech, Biotech & Pharma), works closely with major UK Government agencies such as the Department of International Trade, NHS England and Innovate UK to drive innovation and international partnerships. It provides expert consultancy services to private and public organizations seeking support with fast tracking innovation and securing UK market access.

www.medilinkuk.com



Dr Zohair Sebai and the author Alexander Woodman

Interview

Dr Zohair Sebai – on public health in Saudi Arabia

By Alexander Woodman
Jeddah, Saudi Arabia

More than five years ago, as a University of California Los Angeles (UCLA) student I was in the UCLA Biomedical library doing research for a project and picked up Dr Zohair Sebai's book on *Health in Saudi Arabia*. Since then I have wondered whether I would have the opportunity

to meet Dr Sebai, the founding father of public health in Saudi Arabia, particularly after becoming familiar with the Saudi healthcare system.

In 1950s there were few of hospitals in Saudi Arabia and only 10 Saudi physicians, which represented less than 10% of the total number of physicians in the country. Five decades later the kingdom began to witness rapid growth in the public health

sector. Today there are 462 hospitals and 21,000 Saudi doctors accounting or more than 25% of doctors in the kingdom.

Saudi Arabia is experiencing a remarkable demographic and epidemiological transition, and accompanying this change is a growing burden of non-communicable diseases. At the same time the population's expectations of quality healthcare services is increasing, which has put the

government under pressure to expand healthcare services and make them more accessible to the wider population.

According to the World Health Organization, the number of primary healthcare centres has increased by 8.9% since 2004. The number of hospitals, physicians and nursing staff has also increased. In addition, there have been improvements in several health indicators, such as maternal and child health; as well as immunization, which has resulted in a decrease in many vaccine-preventable diseases and the eradication of poliomyelitis.

Alexander Woodman: Please tell us what made you become interested in Public Health?

■ **Dr Zohair Sebai:** When I was in my secondary school I read a book by A.J. Cronin titled *The Citadel*. It was the story of a doctor who devoted his life to the health of the public, and the prevention of disease. I think this book has shaped my interest in public health.

AW: As the founding father and an expert in Public Health, please give us a brief history of Public Health in Saudi Arabia.

■ **ZS:** In 1950 the Health Services emerged in Saudi Arabia. At that time, we had a couple of hospitals with no more than 1000 beds in the whole kingdom. The total number of physicians was 111 including no more than 10 Saudi physicians. At present after only 64 years we have 462 hospitals; 69,000 beds (one bed for 450 people); 2,200 primary health centres; and 82,000 doctors, including 21,000 Saudi doctors. It is a quite achievement. Public Health activities started slowly with the help of Saudi Aramco. [The Saudi Arabian Oil Company] helped in the control of trachoma, malaria and schistosomiasis. The Eastern Province saw for the first-time health education and maternal and child health programmes among Aramco employees. The Ministry of Health then took over these responsibilities.

AW: Since your first book (*Health in Saudi Arabia* Vol.1 published in 1985). What changes have occurred?

■ **ZS:** We have more hospitals, hospital

beds, primary health care centres and colleges of medicine. The budget for healthcare has soared to unprecedented levels. However, the orientation of health services remained curative as it was before. There is now more effort given to preventive medicine activities.

AW: What are the major Public Health differences that you have observed between Saudi Arabia, other GCC nations, and the rest of the Arab World?

■ **ZS:** We all share a common culture, history and faith. The differences I would say are not between nations, but rather between individuals. Those who are better educated and have a better standard of living usually lead a healthier life, no matter what nationality they belong to.

AW: Is there a difference in the health status within the different ethnic groups in Saudi Arabia and the Arab world?

■ **ZS:** Both genes and environment share their influences on the health status of people. I would say the role played by the environment (education, standard of living, social status) is bigger than the role played by genes. Therefore, the differences between individuals in the same ethnic group are more than the differences between ethnic groups.

AW: Please tell us what Public Health milestones Saudi Arabia has achieved in the past 30 years?

■ **ZS:** Several mile stones occurred in the past three decades. One is the legislation that immunization should be completed before school admission. This raised the level of immunization to a very high level. The second is the influence of high income. In the last 30 years, we started to observe a high prevalence of health problems such as diabetes, hypertension, road traffic accidents and psychosomatic diseases. These are the result of adverse changes to diet, exercise, with an increase in sedentary life and stress. At the same time, we have seen an improvement in the prevalence of infectious diseases, as well as infant and maternal mortality rates. A third mile stone is the tremendous increase in the number of medical schools. However, we need to revise our medical

education system to make it more relevant to our needs.

AW: The current trend in medicine in the United States is the biopsychosocial approach. What do you think of this?

■ **ZS:** This is a natural development. I believe in this model since it became popular in the mid-seventies. It simply goes along with the definition of health provided by the World Health Organization: "Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity."

AW: What changes do you think are necessary – in terms of diet, way of life, and governmental involvement – to bring about positive health changes in Saudi Arabia?

■ **ZS:** We need to have a balanced diet, more exercise and a healthy lifestyle in general. We need to reorient our medical education towards comprehensive health care. We need to produce members of the health sector, who believe in and practice health care in terms of prevention, treatment and promotion as an integrated entity. We need to reorient our primary health care to play a bigger role in promoting health in society. Our hospitals should be health promoting hospitals. Finally, we need to involve people, so they can play an active role in planning, implementing, follow up and evaluating health services provided to them. Let me remind you that this is the stereotype of health care, which needs to be improved in almost every corner in the world.

AW: How does the current geo-political situation affect Public Health programmes in the region?

■ **ZS:** The current geo-political situation hinders public health programs in the region. Saudi Arabia still has better health services compared to many other countries around us. This is because of the stability we enjoy. War is a disaster for innocent people. Most often, more civilians are affected than military. Look at what is happening in Syria and Iraq. Thousands of infants are dying because of lack of food, medicine and shelter. I pray to Allah to give us all peace and stability.



AW: There has been a tremendous influx of foreigners into the Gulf. What is their impact on Public Health in Saudi Arabia?

■ **ZS:** Foreigners bring with them different cultures, habits and ways of life. No doubt, in time, some of these will infiltrate into the Saudi health attitudes and practices. This issue should be researched.

AW: In your book, you remarked that Saudi Arabia's health service is a curative-centred approach. What model do you think is suitable for Saudi Arabia?

■ **ZS:** The comprehensive approach (preventive, curative and promotive) model is what we need. This is applied not only to Saudi Arabia, but to the whole Middle East region. Most of our health problems, acute and chronic, are preventable. So why should we wait until people become sick to treat them. Lately, we have taken good measures toward implementing a comprehensive health care plan through the 2,200 primary health care centres we have, but we need more.

AW: Will this model promote preventive measures and focus on future public health issues and their solutions?

■ **ZS:** I believe if you spend 10% of your health budget on health promotion – health education, better environment, occupational health, safety measures, maternal and child health, etc. – you would gain a lot by minimizing the cost of health care as well as improving the health of the people.

AW: Research and the availability of data are the foundation to framing policies to promote Public Health. Where does Saudi Arabia stand on Public Health research?

■ **ZS:** There is a lot of medical research going on in the kingdom. Hundreds of papers are being published every year in local and international journals. However, we need to emphasise the type of research which would answer the question 'how', not only the questions of 'what and why'. This type of research would help us to solve our current and future health problems.

AW: Lastly, I'm teaching at the Prince Mohammad bin Fahd University in Al Khobar. I deal with dedicated and



Dr Zohair Sebai

hardworking students who are the future Saudi leaders. It's a truly rewarding experience. As a well-respected scholar, educator, and a Public Health pioneer in KSA, what advice can you give the students in terms of the future role they can play in the Public Health sector?

■ **ZS:** They should realize that the causes of disease are not only viruses and microbes, but rather our lifestyles and the environment around us. Unless they prepare themselves to look at health in a comprehensive way they might end up, as many doctors around the globe do –

treating people after they become sick. To widen their scope of interest about health they should develop a humanitarian attitude by reading, attending conferences related to holistic approaches of health and going out among the people to study the biopsychosocial effects on health.

The Author

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The CNA-Q and Aspetar delegation at the signing of the MoU

CNA-Q partnering with healthcare organisations to deliver world-class education

College of the North Atlantic-Qatar (CNA-Q) continues to solidify its connection with the healthcare community in Qatar by the signing of two important Memorandums of Understanding (MoUs).

CNA-Q recently signed a clinical training MoU with Aspetar, the leading specialised orthopaedic and sports medicine hospital in Qatar, so that the required training facilities will be available to CNA-Q Health Sciences students studying Medical Radiography, Respiratory Therapy and Pharmacy Technology. This training is essential to help students fulfil their academic requirements. The agreement is a renewal for Medical Radiography and Respiratory Therapy students, while this is a new offering for Pharmacy Technician students.

Dr Mohamed Ghaith Al Kuwari, Acting Director at Aspetar, and Dr Ken MacLeod, President CNA-Q, signed the agreement that will provide experiential activities and practical learning opportunities for the students.

“This is an important collaborative step towards our joint vision of improving education in Qatar. We have signed several agreements in the past and applied them through training medical students and postgraduate trainees in medicine, nursing and other specialties,” said Dr Al Kuwari.

“The partnership we have with Aspetar, which supports our students to achieve academic success and personal growth



The CNA-Q and PHCC delegation at the signing of the MoU


through their work-term placements, is vital,” said Dr MacLeod. “Aspetar is a highly respected institution, and showcasing our expanding working relationship confirms our commitment to the State of Qatar. It is through these partnerships that the School of Health Sciences can continue to produce highly skilled and qualified healthcare practitioners into the workforce of Qatar.”

In addition to the MoU with Aspetar, CNA-Q also recently inked a deal with Primary Health Care Corporation (PHCC). PHCC operates 21 primary healthcare centres across Central, Western and Northern Qatar. Through these centres, PHCC provides services that focus on disease prevention, public health, and illness diagnoses and treatment, for the entire population.

“Our goal is to develop a local workforce that meets the highest international professional practice standards. Strong support from our clinical training partners ensures that we can continue to meet our

mandate within the healthcare sector,” said Irene O’Brien, CNA-Q Dean of Health Sciences. “These MoUs are recognised by all stakeholders, particularly our accrediting bodies, and are crucial to valid program delivery.”

The partnership with PHCC will allow CNA-Q students to obtain clinical training and practical experience in healthcare and patient care services during the course of their studies. The agreement includes learning opportunities for students in many programs, including Medical Radiography, Pharmacy Technician, Dental Hygiene, Occupational Health and Safety, Health and Wellness Promotion, and Patient Education: Diabetes.

CNA-Q welcomed its first students in September 2002. Since that time, it has grown into the State of Qatar’s premier technical College of applied learning and teaching, with over 30 programs, 2100 current students and over 5000 graduates. 



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Obesity linked to premature death, with greatest effect in men

A study of 3.9 million adults published today in *The Lancet* finds that being overweight or obese is associated with an increased risk of premature death. The risks of coronary heart disease, stroke, respiratory disease and cancer are all increased. Overall, the excess risk of premature death (before age 70) among those who are overweight or obese is about three times as great in men as in women.

WHO estimates that 1.3 billion adults worldwide are overweight, and that a further 600 million are obese. The prevalence of adult obesity is 20% in Europe and 31% in North America. WHO uses body-mass index (BMI, in kg/m²), which relates weight to height, and defines BMI 18.5-25 as normal, 25-30 as overweight, 30-35 as moderately obese, and over 40 as severely obese.

For example, for height 1.6m overweight is about 60-80 kg, and for height 1.8m overweight is about 80-100 kg. Normal BMI spans a range of similar length below this; moderate obesity spans a range of similar length above.

“On average, overweight people lose about one year of life expectancy, and moderately obese people lose about three years of life expectancy,” says Dr Emanuele Di Angelantonio from the University of Cambridge, Cambridge, UK, the lead author. “We also found that men who were obese were at much higher risk of premature death than obese women. This is consistent with previous observations that obese men have greater insulin resistance, liver fat levels, and diabetes risk than women.”

The study found an increased risk of premature death for people who were

underweight, as well as for people classed as overweight. The risk increased steadily and steeply as BMI increased. A similar trend was seen in many parts of the world and for all four main causes of death.

Where the risk of death before age 70 would be 19% and 11% for men and women with a normal BMI, the study found that it would be 29.5% and 14.6% for moderately obese men and women (BMI 30-35). This corresponds to an absolute increase of 10.5% for men, and 3.6% for women – three times as big. The authors defined premature deaths as those at ages 35-69 years.

The new study brings together information on the causes of any deaths in 3.9 million adults from 189 previous studies in Europe, North America and elsewhere. At entry to the study all were aged between 20 and 90 years old, and were non-smokers who were not known to have any chronic disease when their BMI was recorded. The analysis is of those who then survived at least another five years. Of 3,951,455 participants (69% women), 385,879 died.

The study also estimated the population-attributable fraction for mortality due to overweight and obesity (PAF) – i.e. the reduction in deaths in a population that would occur if a risk factor were eliminated. The authors say that assuming that the associations between high BMI and mortality are largely causal, if those who were overweight or obese had WHO-defined normal levels of BMI, then the proportion of premature deaths that would be avoided would be about one in 7 in Europe and one in 5 in North America.

“Obesity is second only to smoking as a cause of premature death in Europe and North America,” says co-author Professor Sir Richard Peto, University of Oxford, Oxford, UK. “Smoking causes about a quarter of all premature deaths in Europe and in North America, and smokers can halve their risk of premature death by stopping. But, overweight and obesity now cause about 1 in 7 of all premature deaths in Europe and 1 in 5 of all premature deaths in North America.”

The researchers also broke down the normal BMI range and found a slightly increased risk at the lower end of it (at 18.5-20 kg/m²).

The authors note that one important limitation is that their only measure of obesity was BMI, which does not assess fat distribution in different parts of the body, muscle mass, or obesity-related metabolic factors such as blood sugar or cholesterol.

Writing in a linked Comment, Dr David Berrigan, Dr Richard Troiano and Dr Barry Graubard from the National Cancer Institute, National Institutes of Health, Bethesda, MD, USA, discuss the methodological limitations of global studies measuring BMI and mortality and the need for improved study designs, as well as the challenges that remain in the effort to translate epidemiological evidence of excess body weight and mortality into effective guidelines and public health interventions. They say: “Challenges in deriving global public health recommendations are unlikely to be resolved by ever larger datasets without further developments in study data and design.”

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WHO urges tax on sugary drinks to reduce consumption

Taxing sugary drinks can lower consumption and reduce obesity, type 2 diabetes and tooth decay, says a new World Health Organization (WHO) report.

Fiscal policies that lead to at least a 20% increase in the retail price of sugary drinks would result in proportional reductions in consumption of such products, according to the report titled *Fiscal policies for Diet and Prevention of Noncommunicable Diseases* (NCDs).

Reduced consumption of sugary drinks means lower intake of “free sugars” and calories overall, improved nutrition and fewer people suffering from overweight, obesity, diabetes and tooth decay.

Free sugars refer to monosaccharides (such as glucose, fructose) and disaccharides (such as sucrose or table sugar) added to foods and drinks by the manufacturer, cook or consumer, and sugars naturally present in honey, syrups, fruit juices and fruit juice concentrates.

“Consumption of free sugars, including products like sugary drinks, is a major factor in the global increase of people suffering from obesity and diabetes,” says Dr Douglas Bettcher, Director of WHO’s Department for the Prevention of NCDs. “If governments tax products like sugary drinks, they can reduce suffering and save lives. They can also cut healthcare costs and increase revenues to invest in health services.”


Fiscal policies should target foods and beverages for which healthier alternatives are available, the report adds.

The report presents outcomes of a mid-2015 meeting of global experts convened by WHO and an investigation of 11 recent systematic reviews of the effectiveness of fiscal policy interventions for improving diets and preventing NCDs and a technical meeting of global experts. Other findings include:

- Subsidies for fresh fruits and vegetables that reduce prices by 10-30% can increase fruit and vegetable consumption;
- Taxation of certain foods and drinks, particularly those high in saturated fats, trans fat, free sugars and/or salt appears promising, with existing evidence clearly showing that increases in the prices of such products reduces their consumption;

- Excise taxes, such as those used on tobacco products, that apply a set (specific) amount of tax on a given quantity or volume of the product, or a particular ingredient, are likely to be more effective than sales or other taxes based on

a percentage of the retail price;

- Public support for such tax increases could be increased if the revenue they generate is earmarked for efforts to improve health systems, encourage healthier diets and increase physical activity. 

Low-intensity physical activity can prevent weight gain in children

As little as 10 minutes of high-intensity physical activity per day reduces the amount of adipose tissue and enhances cardiorespiratory fitness in 6-8-year-old children, according to a new study from the University of Eastern Finland. The higher the intensity of physical activity, the stronger the association with the amount of adipose tissue. Exchanging sedentary behaviour – mainly sitting – for even low-intensity physical activity reduces the amount of adipose tissue. For physical activity to enhance cardiorespiratory fitness, the intensity needs to be at least moderate.

The results published in *Sports Medicine* are part of the Physical Activity and Nutrition in Children (PANIC) Study carried out in the University of Eastern Finland. The study was conducted in collaboration with the University of Cambridge.

The study investigated the associations of physical activity and sedentary time with body adiposity and cardiorespiratory fitness in 410 Finnish 6-8-year-old children. Physical activity and sedentary time were assessed using a combined heart rate and movement sensor, Actiheart. Body adiposity, on the other hand, was measured using dual-energy X-ray absorptiometry (DXA), and cardiorespiratory fitness was assessed using a maximal exercise test on a cycle ergometer. Various confounding factors including diet quality and sleep length were controlled for in the analyses.

The study showed that the more

children spent time doing physical activities, the lower their total body and central body adiposity were. The association between physical activity and body adiposity grew in tandem with physical activity intensity. Children engaging in as little as 10 minutes of high-intensity physical activity every day had 26-30% less central body fat than children who did not engage in high-intensity physical activity. The intensity of physical activity had to be at least moderate for it to be associated with enhanced cardiovascular fitness.

The findings indicate that exchanging 10 minutes of sedentariness for 10 minutes of high-intensity physical activity decreases the total body and central body adiposity by 13%. Moreover, replacing sedentariness with light or moderately intensive physical activity also seems to decrease the amount of adipose tissue, but not as much as high-intensity physical activity. Exchanging 10 minutes of sedentariness for moderate- or high-intensity physical activity enhances cardiovascular fitness.

The findings indicate that even small changes to exercise-related lifestyle habits can have an impact on children’s weight management and cardiovascular fitness. Increasing the amount of physical activity at various intensity levels and reducing the amount of sedentary time seem to be an important way of preventing overweight and enhancing cardiovascular fitness in childhood.

Life is renewed after obesity surgery

Ron Garrison reached his peak weight of nearly 500 pounds (226 kg) in 2010 – but not for lack of trying to slim down. For nearly two decades, the military veteran and Indiana resident had tried the gamut of weight loss approaches, from medically supervised diets and exercise plans to online schemes promising dramatic results. Nothing worked. He continued to gain weight and, with it, health complications.

With a body mass index of nearly 67, Garrison suffered from Type 2 diabetes, high cholesterol, high blood pressure and more. The firefighter could no longer fit into his gear and had to give up his job. Looking at a photo of himself in a tuxedo, he felt the gravity of his situation. Despite taking nearly 12 medications to keep his conditions under control, Garrison was given a startling prognosis – only three years left to live. He decided it was time to consider bariatric surgery.

“I was going to die,” Garrison said. “It wasn’t a matter of ‘if’ but ‘when’. My son had just been born and I thought, ‘I have to be around for him’.”

Looking for options

After researching surgical options, Garrison identified the biliopancreatic diversion with duodenal switch – commonly referred to as duodenal switch or DS – as his preferred procedure to tackle his extreme obesity. He turned to the only regional institution successfully performing

this bariatric procedure since 2002: The University of Chicago Medicine’s Center for the Surgical Treatment of Obesity. UChicago Medicine has conducted pioneering research investigating the procedure and is an international leader in teaching the technique to practicing surgeons.

Garrison underwent a comprehensive evaluation and was found to be an excellent candidate for DS. Director of Minimally Invasive Surgery Vivek N. Prachand, MD, performed Garrison’s duodenal switch on October 28, 2011. The surgery, combined with significant lifestyle changes, helped Garrison get his weight down to about 195 pounds (88 kg) by 2013, a loss of more than half his body mass.

“The important thing to keep in mind regarding obesity surgery,” Prachand said, “is not what the person loses, but rather what the individual gains.”

Support every step of the way

The Center for the Surgical Treatment of Obesity has achieved the highest levels of accreditation for safety and quality, including the national bariatric surgery certification from the Metabolic and Bariatric Surgery Accreditation and Quality Improvement Program. The center helps patients prepare for the life changes involved in bariatric surgery and to be successful in both reaching and maintaining their goals. In addition to the surgeons, a team of nurses, nutritionists,

psychologists, social workers and care coordinators support patients every step of the way.

“We are the only center that offers the full spectrum of operations and provides individualized recommendations,” Prachand said. “Everybody’s obesity and life circumstances are different. It takes a conversation and collaborative decision making to pursue the best options.”

The center offers four types of minimally invasive bariatric procedures – DS, vertical sleeve gastrectomy, roux-en Y gastric bypass and adjustable gastric banding or Lap-Band. Of these approaches, DS gives the best outcomes in alleviating diabetes and helping the most severely obese patients achieve a healthier weight.

Surgery, adjustment and change

The duodenal switch procedure reduces the size of the stomach to a narrow tube through a technique known as sleeve gastrectomy. Food and digestive fluids within the small intestine are then rerouted to decrease appetite and reduce the absorption of some of the calories ingested in the diet, particularly those derived from fat.

Once Garrison’s surgical procedure was complete, he began a lifelong adjustment to meet the demands of his altered anatomy. He strictly follows a modified low carbohydrate diet with a strong emphasis on high protein foods. Garrison also



The important thing to keep in mind regarding obesity surgery, is not what the person loses, but rather what the individual gains.



Prachand pointed out that most people relate to the major effort involved in losing just 15-20 pounds (7-9 kg). “The people we help have 10 times that much weight to lose, which is a whole different ballgame,” he said.

Patients must show a commitment to lifestyle changes through medically managed weight loss attempts before moving ahead with surgery. Positive momentum prior to a procedure helps patients get into in a healthy frame of mind and ready to take on new challenges.

A new life

Garrison began to see dramatic physical changes just weeks after the surgery. He dropped 81 pounds (37 kg) in less than a month and exceeded a 200-pound (91 kg) loss in under a year. He’s maintained his weight loss for several years and no longer takes medications for any obesity-related illnesses.

“The people involved in the obesity center treat you like a family member,” Garrison said. “They were with me every step of the way. The level of care goes far beyond the standard doctor-patient relationship. Everyone cares about your success, and they are going to save your life.” **MH**

takes several daily vitamin supplements to avoid nutritional deficiencies. He no longer consumes carbonated beverages. He also committed to frequent follow-up appointments for several years and a regular exercise regimen.

“It’s a major lifestyle change,” he said.

“You have to be ready mentally and physically. Surgery is just a tool, one step of the process. Then you have to change the way you eat and what you eat; get used to taking vitamins; and take in enough protein each day. It’s a life-changing process, and it totally changed mine.”



The future of hospitals is modular

Middle East Health speaks to KEF Infra's **Sumesh Sachar** on why offsite construction can bring transformative solutions to meet regional healthcare infrastructure needs.

It is hard to imagine that one day hospitals, with their juggernaut of complex structural elements, piping and electricals, will simply be picked from a catalogue, built in half the time it usually takes, and at considerably less cost. Sumesh Sachar, CEO at KEF Infra, the infrastructure arm of UAE-based KEF Holdings, begs to differ. "This reality is here already and ready to take over," Sachar says, referring to the company's initiative developed by its healthcare arm, KEF Health in association with Australian hospital design consultants, TAHPI, called 'Catalogue Hospitals'.

Of the five model hospitals developed within this catalogue, KEF Infra is already nearing the completion of its first project, MEITRA Hospital, which will be India's first fully offsite-constructed 205-bed tertiary facility that can be scaled to 500 beds. With a total build-cost of just US\$5.8 million, the concept hospital spanning 27,870 sq. m. will be delivered in a record 18 months, making a very strong case for its potential.

Understanding the process towards plug-and-play

The process of constructing a hospital off-site starts like every other structure, at the drawing board. "We set out to create a set of ideal form factors for Catalogue Hospitals, but really, the objective is to show that from simple to complex hospital

buildings, modular construction can be applied effectively," Sachar points out.

The design phase

In modular design, while aesthetics play a crucial role, the bigger pursuit is form and functionality. "We typically work hand-in-hand with the healthcare provider and our partner during the design phase. The patient experience is really the starting point for us," says Sachar, adding that based on the estimated patient flow the hospital can be designed to combine functional design, efficiencies in energy usage and an overall positive healthcare experience.

At the core of offsite construction is building information modelling or BIM software Revit. "The technology on which hospital design is built is fascinating. We look at the equipment requirements of the facility and apply it to the Revit model to determine everything from the geometry, shape, the ceiling-floor height of the building. We also factor in details such as how many operating rooms are required, or where should the patients wait at this stage," adds Sachar.

Other technology software such as ETABS and SAFE are applied to the design to check structural quality and stability. KEF Infra also applies Sofistik, an advanced software primarily used in Europe to gauge the building's behaviour in seismic conditions. From an energy efficient

standpoint, the use of insulated wall panels, radiant cooling, and high U-value aluminium cladding, all contribute to a reduction in operating costs for the facility.

Sachar notes that in the Middle East context, the precast concrete facades used in offsite build drastically reduces the work required to fire-proof buildings, adding another advantage to the mix.

Once the structural model is finalized, the MEP (Mechanical, Electrical, and Plumbing) design, which forms the most complex part of hospital structures, is layered on to the structure design and tested for clashes. Clash detection is a critical part of the process that is applied early on in the design phase and continues to be applied at every stage while building the model.

Sachar explains: "Clash detection delivers huge cost savings compared to conventional design, because we are able to identify right at the start where the gaps and cut-outs need to accommodate the MEP matrix."

The construction and delivery phase

Up to 85% of a catalogue hospital is built at an offsite construction manufacturing plant. "The quality we can deliver from offsite construction is far superior to traditional methods, because we are able to test every pore. There is complete transparency in the process," says Sachar.

For example, in cement, the design mix



Meitra modular hospital under construction



A VIP room in Meitra Hospital



The Presidential Suite in Meitra Hospital

can be tested and checked for consistency. On the other hand, the curing period of concrete is controlled, rather than leaving it to the environment, which can yield imperfect results. Processes such as steam curing lends to the cement strength and structural durability of the building. Adding to this the precision offered by highly automated manufacturing processes further increases the quality of offsite-built structures.

Modular pods and precision installation

Using modular MEP, the more complex structures are put together in the form of six-metre frames of all the different elements – electrical, mechanical, plumbing, medical gases, etc. which have been manufactured and tested offsite. These are then brought to the site in the form of modular pods and installed in precise sequences.

mapping of the hospital, as well as an operating manual on how to best utilize and manage the facility.”

In the case of Catalogue Hospitals, the installation and commissioning team additionally offers back-to-back warranties on the equipment sourced from KEF Health partners, GE Healthcare, thereby laying out a total turnkey solution for customers.

How the Middle East can benefit from modular hospitals?

Besides the focus on medical tourism in countries such as the UAE, population growth and a relative rise in health issues are triggering a steady growth in healthcare needs. In the GCC alone, the demand for hospital beds is set to rise at a CAGR of 3.5% touching 162,000 by 2025, according to McKinsey. Another report by Alpen Capital, indicates the GCC’s healthcare

KEF Holdings and MEITRA Hospital

A new era social enterprise headquartered in Dubai, KEF Holdings was founded by philanthropist-entrepreneur Faizal E. Kottikollon, and operates across India, the Middle East and Singapore. The company has five business verticals – KEF Infra, KEF Health, KEF Education, KEF Metals and KEF Investments – that correspond to the core sectors it services. KEF’s industrial forte lies in its ability to create integrated business processes and deliver cutting-edge off-site construction technology and solutions, including precast, prefabricated bathrooms, joinery and aluminium glazing. The company applies this expertise to the creation and upgrades for essential infrastructure, such as educational, healthcare, commercial and residential facilities.

Meitra hospital, developed by KEF Infra for KEF Health illustrates the company’s innovative approach to healthcare. Besides highly superior build quality, the hospital will feature advanced patient management services developed with renowned specialist doctors from Cleveland Clinic, and also house state-of-the-art equipment from GE Healthcare. Combining clinical specialties such as Cardiology, Cardiovascular and Thoracic surgery, Neurology, Neurosurgery and Orthopaedics, among others. Meitra hospital is set to open its doors by 1 December 2016.

“In this format, you know exactly where each piece must go, which floor or grid, much like a jigsaw puzzle. The frames are then connected using a ‘clicking’ technology that is very simple,” Sachar notes. “By developing the MEP structure using BIM, we are able to handover to the customer a complete

market is projected to grow at a rate of 12% per annum to \$69.4 billion by 2018, with Saudi Arabia expected to be the largest market, followed by Qatar and the UAE.

“In the Gulf countries, there is a measured benchmark against which we can apply the various design, time and cost utilities of modular construction. Across the region, however, there are markets that are still grappling with outdated hospital infrastructure, where quick and effective solutions can play a significant role in saving lives,” says Sachar.

“At KEF Infra, we have started speaking to potential partners in Africa as well, where the demand for modern hospital infrastructure is understandably at a peak.”

With the benefits weighing well over any potential disadvantages, it does seem puzzling why the region has not taken a keener interest in the catalogue hospital proposition.

“It comes down to awareness and education, as with any other avant-garde take on concepts that have not changed for centuries. Offsite or modular construction is not really a new concept if you think about it, but the modern treatment to its application in industries such as healthcare is revolutionary. I believe it is only a matter of time before modular design takes root, and evolves in to something even bigger and better,” Sachar says. MEH

Delivering new healthcare capacity across the Middle East

By Yasser Khan and David Smith
Directors, Arcadis Qatar

Recent data from Alpen Capital estimates that the Middle East's healthcare market will grow by more than 50% over the next five years. Research from MEED presents a similar outlook, with US\$60bn worth of investment planned or already underway to help create new healthcare facilities across the region.

This is in response to a number of important trends that are converging at the same time. Rising populations, higher life expectancy rates, wider adoption of healthcare insurance and the rise of lifestyle diseases such as diabetes, obesity and cardiovascular illnesses, are just some of the factors that are creating a need for much greater healthcare capacity within the GCC.

In response to this growing demand, several countries have already allocated significant budgets as part of their ambitious nation-building programs. The challenge now will be to deliver the next wave of hospitals and clinics that enable medical professionals to provide a level of care that responds to their patients' needs and improves quality of life for the local populations.

Maximizing the impact of investment in new healthcare assets

Falling oil prices are having an impact on public sector budgets with some governments beginning to curtail or defer their expenditure plans. However, there's also an appreciation that within

the GCC region, hospital bed density remains significantly lower than in other high income nations. Furthermore, total healthcare expenditure as a percentage of GDP remains considerably lower than the global average.

Governments remain committed to prioritizing investment in healthcare, however the current economic climate means there is an added pressure to ensure that the budget spent, delivers the best possible outcomes for clinicians, patients and local communities.

Many of the world's leading healthcare providers are already active in the region, however on a number of existing projects, they're finding that the full benefits and strategic intent behind their schemes are not yet being realized. This is partly due to the complexity that can arise as a consequence of the number of different stakeholders typically involved in designing and creating a new healthcare facility, however it's also due to the manner in which new healthcare capacity is currently being delivered.

Think 'program' rather than 'project'

If healthcare providers are to achieve productivity gains and ultimately improve the quality of care provided, they need to move away from viewing their project in isolation and embrace a program management approach when it comes to the delivery of new healthcare facilities.

This program-level approach must be vision-led, aligned to strategic objectives, benefits focused, and able to cut across



Yasser Khan, Director, Arcadis Qatar

institutional boundaries that are typical on healthcare schemes. If a single project is about delivering a discrete output like a new hospital building, a program is about the big picture, the delivery of outcomes and the realization of a number of strategic and measurable benefits.

In practice these outcomes may include achieving the capabilities and throughput required across a series of healthcare facilities to reconfigure the way in which services are delivered within a healthcare system. The associated benefit might be an improvement in the quality of care provided, characterised by a lower length of stay for stroke patients or a reduction in readmission rates.

The benefits of a program management approach

By embracing a program management

approach, there are a number of important benefits that healthcare providers can secure as they seek to design and deliver the next generation of healthcare facilities across the Middle East region.

1. A more effective delivery model

Most major healthcare providers know how to interpret a vision and translate this into a strategy. Where there is often a gap in creating a delivery unit that is capable of bringing all of this to life. A successful delivery team needs to balance a number of important priorities. It must be fully engaged with the organization's strategic objectives, clear on how to reflect these in a well-phased program of work, capable of managing multiple departments and end users (each with their own priorities), and able to remove obstacles that impede continuous progress. When designing the delivery model, it's important to have a clear picture on how the healthcare organisation will work once complete. This includes the organizational structure (people and capability), the processes (operational and clinical service model), capital asset requirements and information strategy. This is only possible by taking a program level perspective rather than focusing on a single project.

2. The opportunity to design a genuinely patient-centred system

If a healthcare provider aspires to move away from a supply-driven healthcare system organized around what physicians do, and instead move to one that is organized around patient needs and outcomes, this must be reflected in the blueprint at the very outset. The design of the system needs to consider the types of benefits that the healthcare provider wants to achieve (lower average length of stay, reduction in readmission rates) and ensure that these objectives are reflected in every part of the design process, with clear practical steps from planning to outcomes.

3. A clearer governance structure

One of the weak links that can make it difficult to translate strategy into delivery is the governance arrangements. Taking a program management approach offers providers a control framework which details the roles required to deliver the program

and its associated change, but also ensures that the right people are in the right roles to deliver the best outcome. If the delivery unit is to be effective, it needs to function as an extension of the senior client team and must adopt a forward looking approach that's focused on unblocking delivery obstacles, rather than looking backwards or assigning blame. In our experience success is only possible by engaging people on a vision and a journey that paints a picture of a better future for the organization, rather than focusing on the destination or project end date.

4. A stronger, multi-disciplinary team


One of the key benefits of a program management function is that it will typically incorporate a wider mix of skills and capability that are needed to help deliver the program of works. As well as program and project managers, a team will also include design managers, people with a clinical background, engineers, healthcare planners and demand and capacity specialists amongst others. Good stakeholder engagement of this group enables everyone to have a voice and input in the direction of the program. These soft skills are key, particularly in finding the right balance between when to allow some users to have greater input (for example, recognising that clinical users need more involvement at the start of the process) and when to challenge proposals using an evidence-based approach.

5. A greater ability to respond to change and manage risk

Programs take longer to complete than a project and as such, will normally carry a higher level of risk. Circumstances will inevitably change and a key challenge for program managers is to deal with this uncertainty without deviating from the larger vision. This is particularly relevant for a region like the Middle East which is rapidly changing and increasingly fraught with geopolitical, socioeconomic and technological risk. Healthcare providers need to be flexible and able to re-evaluate priorities in terms of capital allocations. A program management approach doesn't predict the future, but it does better equip teams to cope with the ambiguities inherent in the delivery of healthcare in the region.

Taking a long-term view of success

Although the benefits and outcomes may take longer to materialise, a program management vision, blueprint and benefits plan will help to prevent a disjointed and piecemeal approach that misses key pieces of the jigsaw. Delivery of ambitious new care models in an acute setting may well be the right approach to the reconfiguration of services, but it will only be part of the picture – and may end up pushing problems further down the line if the necessary infrastructure is not available in primary or community care settings.

In a region where there is a need and an appetite (both private and public) to invest in the health sector, the planning and delivery of new facilities has to be underpinned by, and respond to, a series of strategic imperatives. The individuals charged with this need to understand the region, the sector, and the subtleties of what makes an effective program management function, in order to deliver the right types of assets and improve the quality of care that is offered to citizens across the GCC. 

About Arcadis

Arcadis is the leading global Design & Consultancy firm for natural and built assets. Applying their deep market sector insights and collective design, consultancy, engineering, project and cost management services, Arcadis work in partnership with their clients to deliver exceptional and sustainable outcomes throughout the lifecycle of their natural and built assets.

The company has 27,000 people in over 70 countries and generates 3.4 billion in revenues. They have been active in the Middle East since 1904 and can call upon the skills and experience of over 1,800 people based in 10 offices across the region including UAE, Qatar, Saudi Arabia, Oman and Bahrain. Arcadis supports UN-Habitat with knowledge and expertise to improve the quality of life in rapidly growing cities around the world.



The Global Burden of Disease 2015 study reports that worldwide, the number of deaths in children under the age of 5 has more than halved.

Global study shows life-expectancy up, but progress not universal

The Lancet recently published the Global Burden of Disease 2015 study. It is the most up-to-date analysis on the state of the world's health intended to equip governments and donors with evidence to identify national health challenges and priorities for intervention. This massive effort brings together 1870 independent experts in 127 countries and territories as part of the Global Burden of Disease, Injuries, and Risk Factors (GBD) 2015 study collaboration. *Middle East Health* reports.

The Global Burden of Disease study (GBD 2015) shows that globally, people's health is improving, but progress has been far from universal. The report highlights areas where improvements must be made.

For the first time, GBD 2015 includes a measure of development (the Socio-Demographic Index, or SDI, which is based on income per capita, educational attainment and total fertility rate) in order to assess a country's observed performance compared to their expected performance based on their stage of development.

GBD 2015 analyses 249 causes of death, 315 diseases and injuries, and 79 risk

factors in 195 countries and territories between 1990 and 2015. Four capstone papers are published alongside two on child and maternal mortality.

"Development drives, but does not determine health," says Dr Christopher Murray, Director of the Institute for Health Metrics and Evaluation (IHME) at the University of Washington in Seattle, the coordinating centre for the GBD collaboration. "We see countries that have improved far faster than can be explained by income, education, or fertility. And we also continue to see countries – including the United States – that are far less healthy

than they should be given their resources."

Commenting on the report, K Srinath Reddy, Public Health Foundation of India, said: "We can celebrate the 10-year rise in global life expectancy from birth, which occurred between 1980 and 2015, especially the upswing since 2005 in sub-Saharan Africa which was devastated by HIV/AIDS in earlier decades. There is, however, a grim pointer that regions affected by conflict are showing a decline in life expectancy – for example, in Syria male life expectancy dropped by 11.3 years in the past decade. It will be tragic if the life expectancy gains accruing from

socioeconomic development and scientific advance are undermined by conflicts which feed sectarian violence and fuel social disruption. The rise in disability-adjusted life-years lost due to war and interpersonal violence in some regions demands that political processes place a premium on peace, social stability, prevention of crime, and arms control.”

Life expectancy

The world population has gained more than a decade of life expectancy since 1980, rising to 69.0 years in men and 74.8 years in women in 2015. An important contributor to this has been large falls in death rates for many communicable diseases particularly in the last 10 years, including HIV/AIDS, malaria, and diarrhoea. The rate of people dying from cardiovascular disease and cancers has also fallen, although at a slower pace.

The number of annual deaths has increased from roughly 48 million in 1990 to almost 56 million in 2015. 70% (40 million) of global deaths in 2015 were due to non-communicable diseases (NCDs including ischaemic heart disease, stroke, diabetes, chronic kidney disease, Alzheimer’s disease and other dementias, and drug use disorders). In 2015, an estimated 1.2 million deaths were due to HIV/AIDS (down 33.5% since 2005), and 730,500 were due to malaria (down 37% since 2005).

Health loss

In the past 25 years, the main causes of health loss (measured in years lived with disability, or YLD) have hardly changed – in 2015, low back and neck pain, sense organ disorders (including hearing loss and vision loss), depressive disorders and iron-deficiency anaemia were the leading causes of health loss.

In 2015, eight causes of chronic disease (affecting people for 3 months or longer) each affected more than 10% of the world population: cavities in permanent teeth (2.3 billion people), tension-type headache (1.5 billion), iron-deficiency anaemia (1.47 billion), hearing loss (1.2 billion), migraine (959 million), genital herpes (846 million), common (refractive) vision problems (819 million) and ascariasis (an

intestinal worm; 762 million).

Rates for just 14 chronic conditions fell fast enough to outstrip population growth and ageing and resulted in declines in the actual number of people with that condition including chronic obstructive pulmonary disease (COPD), asthma, cervical cancer, and ischemic heart disease.

Living with illness and disability

Although healthy life expectancy has increased steadily in 191 of 195 countries (by 6.1 years) between 1990 and 2015, it has not risen as much as overall life expectancy (10.1 years), meaning people are living more years with illness and disability.

The burden of ill health (measured in disability-adjusted life years, or DALYs ie, the burden of years lost to premature death and disability) has shifted from communicable, maternal, neonatal, and nutritional disorders (e.g. HIV/AIDS, malaria, lower respiratory infections, diarrhoeal diseases, measles, and malnutrition) to disabling NCDs (e.g. drug use disorders (particularly opioids and cocaine), hearing and vision loss, and osteoarthritis) – mainly due to increases in population numbers and ageing, a trend with massive implications for health systems and the costs of treatment.

Risk factors for premature death and ill health

Since 1990, there have been particularly large and concerning increases in exposure to high BMI, drug use, occupational carcinogens (e.g. diesel exhaust and benzene), ozone pollution, and high blood sugar, which affect the burden of conditions like diabetes, heart disease and cancers. Additionally, exposure to other risks including dietary risks (e.g. diets high in salt and low in vegetables, fruit, whole grains, nuts and seeds, and seafood which together account for more than 10% of ill health worldwide), high cholesterol, alcohol, and ambient air pollution have changed very little, highlighting huge opportunities for intervention.

In contrast, marked inroads have been made in reducing exposure to some highly preventable risks such as smoking, unsafe sanitation and water, and household air

High blood pressure, smoking, high blood sugar, high body mass index, and childhood undernutrition were the world’s leading risk factors for premature death and ill health in 2015.

pollution, although they remain major causes of poor health. Unsafe sanitation, for example, claimed 306,000 fewer lives in 2015 (total deaths 808,000) compared to 2005. Whilst exposure to smoking fell by over a quarter worldwide, it is still ranked among the top five risks associated with health loss in 140 countries claiming 289,000 more lives in 2015 (total deaths 6.4 million) than 2005, and is the leading risk factor for poor health in the UK and the USA.

Maternal mortality

Worldwide, maternal death rates have been reduced by nearly a third since 1990, falling from 282 deaths per 100,000 live births in 1990 to 196 in 2015, with progress accelerating since 2000. Yet, in 2015 more than 275,000 women died in pregnancy or childbirth in 2015, mostly from preventable causes.

Two thirds (122) of countries have already met the Sustainable Development Goal (SDG) target to reduce the number of women dying from pregnancy-related causes to less than 70 for every 100,000 live births by 2030. However, 24 countries have seen increasing maternal death since 2000 – many of these countries have been affected by

conflict (e.g. Afghanistan and Palestine), but some are also high-income countries like the USA, Greece, and Luxembourg. Moreover, disparities between countries are widening, with the proportion of all maternal deaths rising from 68% in 1990 to 80% in 2015 in the poorest countries, where haemorrhage is the main cause of maternal death and teenage pregnancy

is much more common. In contrast, in high-income countries most maternal deaths are related to complications like heart problems, blood clots, and complications of NCDs.

Under-5 mortality

Worldwide, the number of deaths in children under the age of 5 has more

than halved from 12.1 million in 1990 to 5.8 million in 2015, and the gap between groups of countries with the lowest and highest rates of child mortality is shrinking. Accelerated progress since 2000 is mainly as a result of tackling infectious diseases like malaria, diarrhoea and measles. However, the world fell short of the Millennium Development

The Global Burden of Disease in the

Since 1990, life expectancy has risen and both child and maternal mortality have declined in the Eastern Mediterranean Region, according to the recently published Global Burden of Disease study in *The Lancet*.

However, such progress is threatened by increasing numbers of people suffering from serious health challenges related to metabolic risk factors, such as high blood pressure, high body mass index, and high blood sugar.

“We are seeing a rise in non-communicable disease in the region, mainly due to behavioral changes such as diet and physical activity,” said Dr Ali Mokdad, Director of Middle Eastern Initiatives at the Institute for Health Metrics and Evaluation (IHME) at the University of Washington. “At the same time, unrest and instability in the region will only further health loss from these diseases as services become limited and infrastructure is destroyed.”

Heart disease

Ischemic heart disease was the leading killer in 19 of the region’s 22 countries in 2015, resulting in 56,391 deaths in Afghanistan, 30,156 deaths in Morocco, and 15,650 deaths in Saudi Arabia. The leading causes of death in the region’s remaining three countries were pneumonia (668 deaths in Djibouti), diarrheal disease (19,738 deaths in Somalia), and war (54,060 deaths in Syria).

But the conditions that kill are not typically those that make people sick.

The top three nonfatal causes of health loss in the Eastern Mediterranean Region overall were iron-deficiency anaemia, low back pain, and depression.

In north Africa and the Middle East, large discrepancies occurred between observed Years of Life Lost (YLLs) and those expected on the basis of the Socio-Demographic Index (SDI), underscoring the region’s rapid development and inequalities in wealth. Furthermore, because of the region’s escalating rates of war-related mortality, which is not strictly related to SDI, ratios of observed versus expected YLLs from war were extremely high. The United Arab Emirates (UAE) and Afghanistan had the

most causes for which observed levels of YLLs exceeded expected YLLs; these causes ranged from ischaemic heart disease to interpersonal violence for Afghanistan, and included chronic kidney disease, COPD, diabetes, and road injuries for the UAE. Many countries in the region recorded substantially lower YLLs than expected for several causes: 13 had ratios less than 0.60 for lower respiratory infections, including Iraq (0.40) and Palestine (0.25); eight countries had ratios less than 0.60 for stroke, including Lebanon (0.45) and Turkey (0.42); and six had ratios less than 0.60 for preterm birth complications, including Egypt (0.47) and Syria (0.19).

Sample findings from the region

- Over the past 25 years, life expectancy has increased throughout the Eastern Mediterranean Region. In 2015, the life expectancy at birth was 79 years in Bahrain, 72 in Egypt, 66 in Pakistan, and 68 in Sudan.
- While the world has made great progress in reducing deaths of young children, globally 5.8 million children under the age of 5 died in 2015. Of that global figure, 750 of those deaths were in Oman, 2,780 in Tunisia, and 19,910 in Iran.
- Many countries in the Eastern Mediterranean Region have reduced maternal mortality. For example, the

number of maternal deaths in 2015 in Lebanon was 13, down from 24 in 1990. And in Jordan, the ratio of maternal deaths fell from 116 deaths per 100,000 livebirths to 48.

- In 2015, war was the greatest contributor to disability in Afghanistan, Iraq, Lebanon, and Syria. For Syrian men, life expectancy fell more than 11 years compared to the pre-war year of 2005.
- Diabetes also causes a disproportionate amount of disability, ranking in the top three leading causes of disability in over half of the countries in the region in 2015 including Egypt, Iraq, and Kuwait.

Goal (MDG) target to reduce child mortality by two thirds between 1990 and 2015.

One area that needs special attention is neonatal (in first month life) deaths which are falling more slowly than under-5 deaths and accounted for nearly half (2.6 million) of all deaths in children under 5 in 2015. Preterm

birth complications and birth asphyxia and trauma are now the leading causes of deaths in children younger than 5 years worldwide, highlighting the slower progress in reducing neonatal conditions compared with communicable diseases in childhood. Over a third of countries worldwide still face substantial challenges to reduce neonatal mortality to fewer

than 12 deaths per 1000 livebirths by 2030, especially in low- and low-middle income countries with Mali (40.6), Central African Republic (40.2), and Pakistan (37.9) recording the worst rates in 2015.



Global Burden of Disease 2015
www.thelancet.com/gbd

Eastern Mediterranean Region

Data for United Arab Emirates

All data are for all ages and both genders unless otherwise specified.

Top five causes of death 2015:

1. Ischemic heart disease – causes 21.6% of total deaths
2. Motor vehicle road injuries – 9%
3. Hemorrhagic stroke – 6.4%
4. Diabetes – 3.8%
5. Ischemic stroke – 3.6%

Top five causes of years lived with disability (YLDs) 2015:

1. Low back pain – 8.2% of total YLDs
2. Diabetes – 8.1%
3. Major depression – 7.2%
4. Other musculoskeletal – 5.5%
5. Migraine – 5.3%

Top five causes of disability-adjusted life years (DALYs) 2015:

1. Ischemic heart disease – 9.3%
2. Motor vehicle road injuries – 5.8%
3. Diabetes – 5.5%
4. Low back pain – 4.2%
5. Major depression – 3.6%

Note that DALYs are the sum of YLLs and YLDs. One DALY equals one lost year of healthy life.

Top five risk factors in terms of DALYs 2015:

1. High body-mass index – 12.7%
2. High fasting plasma glucose – 10.3%
3. High systolic blood pressure – 10%
4. High total cholesterol – 7.4%
5. Diet low in whole grains – 5.9%

Maternal mortality

Number of maternal deaths 1990: 15

Number of maternal deaths 2015: 18

Ratio of maternal deaths 1990 (per 100,000 live births): 31.8

Ratio of maternal deaths 2015 (per 100,000 live births): 18

Annualized percentage change of ratio of maternal deaths 1990-2015: -2.3

Under-5 mortality

Number of under 5 deaths 2015: 540

Ratio of under 5 deaths 2015 (per 1,000 live births): 5.5

Annualized percentage change of ratio of under 5 deaths 1990-2015: -6

Life expectancy females

2005: 77.3

2015: 78

Healthy life expectancy females

2005: 66.2

2015: 67

Life expectancy males

2005: 74.2

2015: 74.5

Health life expectancy males

2005: 64.5

2015: 65

Note that MDG4 called for countries to decrease under 5 mortality by an annual rate of 4.4%.



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The MSF-supported hospital in Ma'arat Al Numan was attacked and destroyed on Monday 15 February. At least 25 people were killed, including nine staff members. The 30-bed hospital had 54 staff, two operating theatres, an outpatient department and an emergency room. The outpatient department treated around 1500 people a month, the ER carried out an average of 1,100 consultations a month, and around 140 operations a month, mainly orthopaedic and general surgery, were carried out in the operating theatres.



MSF demands Syrian Government and allies stop indiscriminate bombing in Aleppo

Médecins Sans Frontières/Doctors Without Borders (MSF) issued a statement 30 September demanding that the Syrian Government and its allies stop the bombing that is provoking a bloodbath among civilians in the city. On 28 September, just hours before the UN Security Council met to discuss the implementation of resolution 2286 on the protection of medical facilities, two more MSF-supported hospitals were seriously damaged by bombing and went out of service.

“Bombs are raining from Syria-led coalition planes and the whole of east Aleppo has become a giant kill box,” says Xisco Villalonga, director of operations at MSF. According to the Directorate of Health in east Aleppo, from 21 to 26 September, those hospitals that are still functional in Aleppo reported receiving more than 822 wounded, including at least 221 children, and more than 278 dead bodies of which at least 96 were children.

“All intensive care units are full. Patients have to wait for others to die so they can be moved to an available bed in intensive care. We only have three operating theatres and yesterday alone we had to do more than 20 major abdominal surgeries,” says Dr Abu Waseem, manager



Damage inside the MSF-supported Al Daqaq hospital after two bombings nearby.



of an MSF-supported trauma hospital in east Aleppo. “The hospital staff is working up to 20 hours a day – they cannot just go home and let people die.”

The massive number of wounded is rapidly depleting the stocks in all hospitals. MSF succeeded in delivering a cargo of medical supplies into the city during the brief period where the siege was broken back in August, but has not


been able to do so again. “Over the last months, we have done everything we could to keep supporting the hospitals in Aleppo. Now, with a complete siege on the city, attacks on humanitarian convoys and intensive bombing, we are powerless,” says Villalonga.

The situation was already critical in east Aleppo before this renewed offensive. MSF released its report on the attack on Al

MSF in Syria

MSF supports eight hospitals in Aleppo city. It runs six medical facilities across northern Syria and supports more than 150 health centres and hospitals across the country, many of them in besieged areas.

Quds hospital in April, which illustrates the daunting working conditions of hospitals in the city, and the brutal effects of the attacks on both hospital staff and on the access of the population to health services. “In April, when Al Quds was bombed, it was the worst offensive to date, yet unimaginable limits have been surpassed since then and if this intensity of bombing continues, there may not be a single hospital standing in a few days,” continues Villalonga. “All hospitals in east Aleppo have been affected by the bombing since April. Al Quds hospital itself was hit and damaged again in August after intense efforts to rehabilitate the facility and resume activities.” Medical facilities have also been damaged in west Aleppo in the last months.

“Russia and the other members of the UNSC must respect the resolution on the protection of medical facilities and put an end to the total disregard for humanity that is being displayed in Aleppo today,” says Villalonga. “The ruthless, brutal bombing must stop and urgent measures need to be put in place to allow the evacuation of the severely sick and wounded to areas where they can access adequate medical care. Anything short of this is confirmation of what many are dreading, that the world has abandoned the people of Aleppo to a violent, agonising death.” 

Médecins Sans Frontières is an international medical humanitarian organisation that delivers aid to people affected by armed conflict, epidemics, natural disasters or exclusion from health care in more than 60 countries around the world. Visit: www.msf-me.org

Interview

Working under siege in east Aleppo – a doctor tells of the appalling conditions

Médecins Sans Frontières: What is the situation like in general in east Aleppo?

■ **Dr Abu Waseem:** We have been living under siege since last July. Getting basic needs, including food, has become an impossible mission. Long queues at the bakeries are a familiar scene. The same goes for any other basic human needs. The city has been without electricity for six months now and people have been relying on generators, which will not be able to serve them for long due to the lack of fuel. Basically, the siege, together with the heaviest bombing I have ever seen, has turned the city into hell.

MSF: How do hospitals work under such circumstances?

■ **AW:** Hospitals work 24/7 now with the fiercest bombing this city has seen in the last three years. We have only three operating theatres and the other day we had to do more than 20 major abdominal surgeries. Above all, we consume enormous amounts of medical supplies and we were not prepared for such a level of violence.

MSF: How do the doctors and nurses deal with this situation?

■ **AW:** Medical people are working two and three times what a human can take. Sometimes, they work for up to 20 hours a day. You simply can't leave people to die and go home. We are overwhelmed but I think there is a level of commitment that makes me proud of what we do. We try our best to save lives but we face death every day.

MSF: What are the main challenges that you face as a doctor?

■ **AW:** The city as a whole is facing a serious lack of intensive care units. With

this degree of bombing that we have to endure, all ICUs are full. Patients have to wait for others to die so they can be moved to an ICU. Sometimes we have to make extremely difficult decisions and let a patient who will not make it die, so that another patient can have a chance to live.

Another main problem is that we have nowhere to refer our patients. Some of them have extreme burns or other medical conditions that we cannot treat in east Aleppo. They are trapped here with us. We do what we can to save them but we do not succeed all the time.

MSF: Has there been any incident in particular that you will always remember?

■ **AW:** Yes! A 12-year-old girl was in desperate need of ICU care. We didn't have a ventilator and it was midnight. We called every hospital in the city but we could not find her a place. Finally, we heard that one hospital had been affected by bombing and their ICU unit was partially damaged but the ventilator had survived. I could not believe it. We immediately went there in the dark under the bombing for seven kilometres and got that ventilator, which saved her life.

MSF: How do people and medical staff see the future?

■ **AW:** People are desperate; they are living day by day and hope that the war will end. As for us, we will keep working until we have a way to get more supplies and refer the wounded and the sick people, or until we are left with nothing. The people of east Aleppo are trapped here and we are here for them.

Redefining the diagnostics industry in the Middle East

Middle East Health speaks to Harald Wolf, General Manager of Roche Diagnostics Middle East, who recently moved to Dubai to lead Roche Diagnostics Middle East.



Harald Wolf, General Manager, Roche Diagnostics Middle East

Harald Wolf, who took up his position at Roche Diagnostics Middle East on 1 June, is responsible for 16 countries in the region. He points out that he has had “a very long history with the company – more than 20 years. In my last position I was also responsible for a very broad region covering all the Eastern European countries, Greece and Africa and the sub-Sahara, so I’m familiar with emerging markets and the unpredictability that comes with it.”

Talking about the Middle East, he added: “The 16 markets we serve in the Middle East are very heterogeneous. However, there are countries that have a very good infrastructure – while others clearly need to be further developed. Overall, I think over the last few years – particularly in some countries – there has been a greater focus on developing the healthcare system mainly through governmental investment.”

He cited the UAE as a frontrunner in innovative approaches in the region. “I believe in constantly raising the bar and elevating standards while maintaining the highest quality; these must go hand in hand. What I have noticed is that the UAE system which is so successful is now regarded as best practice – the role model – by some other countries.”

Roche set up a Management Centre in Dubai in 2012.

“It is a strong evidence of our commitment to the region,” said Wolf. “We see it as a great opportunity to bring all of the Roche innovations to the regional markets and closer to our partners. We have set up a logistics hub and a regional customer support centre from Dubai. From Dubai we serve all of the markets in the region, although in each market we have our representatives. We have marketing representatives in all the countries, so whenever there’s a question from one of our customers they can ap-

proach our local representatives.

“Our call centre is a vital element in our operations. If customers urgently need to connect with us, they can call the hotline and be provided with a solution from a dedicated team of experts in in-vitro diagnostics. For 80% of calls coming in to the call centre, a solution is given within 20 minutes.”

A dedicated training centre has also been set up in Dubai and more than 8,000 people have taken Roche’s training courses to date.

Research & Development

Roche invests 12% of total sales in research and development. “This is remarkably high compared to others,” Wolf remarked. “Why do we do it? It’s our firm belief in innovation. It is at the heart of everything we do at Roche and brings value to patients. However, if we’re not able to develop products by ourselves Roche is also active in acquisitions.”

Commenting on the strength of the company, Wolf said: “Roche is number one in diagnostics because we have the broadest portfolio in the world. In immu-

nology, we have 166 assays – more than any other company. We have fully automated solutions, which bring incredible value to the laboratory, because it makes the lab very efficient. Moreover, it is safe for the technician and the outcome is accurate because the automation reduces the risk of contamination. Not to mention the cost savings it brings.”

Wolf noted that the region’s growing population poses a challenge. “There are certain diseases that are challenging, such as diabetes which has an 11% prevalence in the region. This is comparatively very high.

“The number of oncology cases has also increased – all of this has an impact on how healthcare is provided. The ageing population is also a challenge and this impacts on how the healthcare system will be financed in the future.” MEH

Roche Diagnostics raises the bar on blood screening at the ISBT conference

Roche Diagnostics introduced powerful blood safety innovations at the 34th International Conference of the 34th International Congress of the International Society of Blood Transfusion (ISBT) in Dubai, United Arab Emirates, in September.

Roche had the honour of having HH Shaikh Mohammad Bin Rashid Al Maktoum, Vice-President and Prime Minister of the UAE and Ruler of Dubai, visit their stand on the second day of the show.

These cutting-edge solutions Roche exhibited will enable blood banks in

the Middle East and around the world to improve blood screening, which is required to provide safe and secure blood supplies. Harald Wolf, General Manager of Roche Diagnostics Middle East, noted that the company’s “comprehensive portfolio of advanced serology screening and Nucleic Acid Testing (NAT) technologies, delivers industry-leading reliability and workflow efficiency for blood centres, bringing peace of mind to both physicians and patients”.

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Recognising the role of caregivers with the growing prevalence of Alzheimer's



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

I'm amazed how our brains are able to hold memories with such detail that you could almost be transported back to a past time or place. It is easy to take for granted the vast amount of information our minds store, so when a security password or colleague's name temporarily slips my mind I find myself in a momentary panic. As we grow older these lapses in memory tend to worry us more. What will I do if one day I struggle to remember my own name or cannot recognise my loved ones? I am not alone, I imagine, in fearing age-associated conditions, such as Alzheimer's, especially as it can take away not just memories, but also one's independence, personality and dignity.

The population is ageing in the Middle East. And as people are living longer we have naturally seen an increase in neurodegenerative syndromes typical of old age, with a significant rise in the prevalence of Alzheimer's. However, although common in later years of life, Alzheimer's is not part of normal ageing. It is a complicated disease affecting parts of the brain that control thought, memory and language. Unfortunately, many countries in the Middle

East have very limited records and data regarding the number of people suffering with dementia. The World Health Organisation (WHO) says that they expect to see a 125% increase in cases of Alzheimer's in the Middle East by 2050.

Unfortunately, there is still a lack of understanding around what actually causes this condition. What we do know is that Alzheimer's is a neurodegenerative disease which forms abnormal structures within the brain known as plaques. This causes a breakdown of connections between nerve cells. Eventually, these cells die and the surrounding tissue shrinks. This can lead to a deterioration of memory, difficulty with language and changes in personality. Loss of body functions, such as incontinence; swallowing and walking are also typical at more advanced stages of the disease. Ultimately, it reaches a stage where the brain can no longer relay messages to keep the body functioning, eventually causing death. As with all illnesses, a great deal more can be done to slow the progress of Alzheimer's when it is diagnosed early, however the early stages can often be overlooked as a natural result of ageing.

Alzheimer's Disease International (ADI) recognises that across the world it is generally the family and friends of those suffering with the disease who really form the cornerstone

of care and support. Traditionally in Arab culture, the onus of caring for the elderly falls to the family, but in the case of Alzheimer's this is often not ideal because as the disease progresses those suffering can find normal surroundings unsettling and too complicated to deal with. This places an enormous strain on carers. The 2015 World Alzheimer's report estimates that 94% of people living with dementia in low and middle income countries are cared for at home.

Current drug therapies are available to treat the symptoms of Alzheimer's, but there is as yet nothing that can stop or reverse the disease. There has however been a significant increase in investment worldwide in recent years to find cures for this and other forms of dementia. Clinical studies play a major part in investigating factors that could potentially cause the disease and also to trial new treatments. As expert suppliers in comparators to pharmaceutical companies, Durbin is aware of the huge costs and challenges that new drug development incurs. It is heartening to know therefore that governments are finally recognising Alzheimer's as a priority and are supporting ongoing research and development. It is equally important, however, that our governments recognise that funding the support of care givers should be a priority as well. ■ **MEH**

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

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South Korea: One of Asia's most advanced medical tourism destinations

Number of Arab medical tourists increases exponentially

The Korean Government has supported the healthcare and medical technology industries for many years. In line with this government initiative, Korea National Tourism Organization (KNTO) has been promoting medical tourism internationally along with other government departments. The collaboration has helped in making South Korea one of Asia's most significant destinations for medical tourism.

In 2015, South Korea hosted 296,889 medical tourists from more than 190 countries, an increase of 11.4% from the 266,501 patients in 2014. These numbers continue to increase from the

211,218 patients in 2013.

South Korea offers a blend of high-quality care with high-tech techniques and procedures at prices far less than Europe, Japan and the United States. South Korea has become one of the leaders in organ transplants and cancer treatments throughout the world.

South Korea's popularity began with the entertainment industry and continued with younger generations seeking procedures and surgeries in the beauty and cosmetics industry. This led the tourism industry to develop a specific division for medical tourism. Marketing of South Korea as

a medical tourist destination began in 2011, and the number of visitors from countries around the world has increased exponentially.

Gulf countries

South Korea has been working closely with Gulf countries to welcome Arab patients seeking health care in the country. They implemented guidelines with Islamic/Muslim patients in mind so their needs for clinical care, food services, accommodation and translation services were in compliance with their religious doctrines. This brought an increase in the

Case study

Fatima Al Ali (female, aged 35) who suffered from juvenile diabetes since she was 6 had to receive a kidney transplant because her kidney function had significantly deteriorated due to frequent haemodialysis and transfusion. She said that “when I heard that the American hospital in US could not give me the transplant, I was really disappointed. But, I was not concerned because I was told that ASAN Medical Center, South Korea has the best technique in the world. When I return home, I will definitely recommend Korea’s medical techniques.”

amount of UAE nationals visiting Korea for medical services, a staggering 2,946 UAE patients in 2015. UAE nationals spend the most among other patients for medical expenses, with an average of US\$13,560 per patient. The services sought in Korea include spinal treatments, surgery, orthopaedics, cancer treatment, stem cell transplants and beauty treatments.

The UAE and South Korea have signed a number of MoUs on healthcare services since March 2011. The Health Authority of Abu Dhabi (HAAD), Sharjah (SHA) and Dubai (DHA) signed multiple healthcare service agreements with South Korean hospitals and medical centres to continue the improved quality and cooperation between medical providers in both countries. Korea has also successfully strengthened their healthcare services and assured a transfer of knowledge and information between healthcare providers. Last year, the Kuwait Government also signed an MoU with the South Korean Government to strengthen the medical services.

Up-to-date and accurate medical tourism information can be found on the Korea Tourism Organization website at www.visitmedicalkorea.com. This user-friendly platform offers services for medical tourists so they can plan their visit easily. Visitors can book consultations and receive travel information, and there is a list of all leading clinics and hospitals with contact



information. Medical service choices on the website include everything from routine health screenings to treatments for serious illness. This website currently serves those who speak Arabic, Chinese, Japanese, English and Russian.

South Korea aims to attract one million Muslim tourists by the end of 2016, GCC nationals are able to travel to South Korea relatively easily, and many of the GCC tourists are enticed by the scenery and environment as well as the cuisine, resorts, culture and weather. The number of visitors from GCC to South Korea in 2015 was 23,440, and it is growing annually by 20 to 30%. Visitors from GCC countries enjoy a 30-day visa on arrival in South Korea. UAE nationals can enjoy a 90-

Superiority of severe disease cure in Korea


The excellent medical skills in South Korea regarding cancer, cardiovascular disease, organ transplant and brain disease are proven by international comparative data.

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- Multi-lingual coordinators
- Customised counselling centers
- Separate rooms for VVIP’s

day visa on arrival, which allows them to receive world class medical services and recuperate in a safe, friendly atmosphere before returning home. 

Korea Medical Tourism Convention

Korea National Tourism Organization Dubai office is planning to organize a two-day event for the 2nd Korea Medical Tourism Convention from 2pm-9pm on 10th & 11th November at the Abu Dhabi InterContinental Hotel. The event will feature the leading hospitals in South Korea as well as specialist medical travel agencies along with providing free consultations, business meetings and seminars presented by hospitals.

Multiple Myeloma 2016: where do we stand?

Multiple myeloma (MM) is the second most common hematologic malignancy in the United States, with rising incidence and prevalence, and is fast becoming an expanding health care burden globally. At a median age of 69, it may manifest differently, however, detrimental effects of abnormal plasma cells invariably involve the bone marrow, skeleton, kidneys, electrolytes and may predispose patients to infections by impairing immunity.

Though considered incurable, the field of MM, the survival of patients has more than doubled over the past decade.

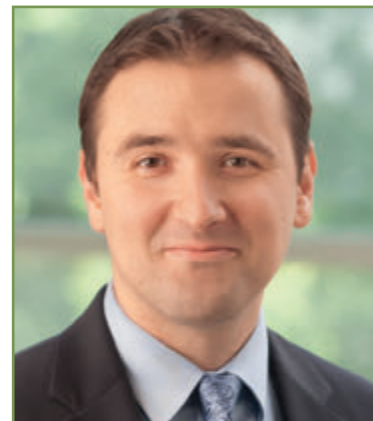
Muhammed Baljevic, M.D., a multiple myeloma specialist and his team at the University of Nebraska Medical Center/Nebraska Medicine (UNMC) have been providing the latest treatment option, which includes the use of cornerstone agents such as proteasome inhibitors (PIs) and immunomodulatory drugs (IMiDs), and their combinations. Daratumumab and elotuzumab recently became the first monoclonal antibodies to join the therapeutic armamentarium against MM.

Unfortunately, despite tremendous advances and ever increasing degrees of response, disease usually relapses, with decreasing remission durations upon each additional treatment.

On the brighter side, small molecules and an array of antibodies against other surface antigens and immune checkpoints are already part of early phase development in humans. The present appears to suggest chemo-immuno approaches as the future standard in the front-line setting, for both transplant eligible and transplant unfit patients. Consolidation therapy with Bi-specific T-cell engagers (BiTE), vaccine and checkpoint immunologic approaches also promise to push the boundaries of short and long-term outcomes.

Nizar Mamdani, executive director of UNMC's International Healthcare says: "Dr Baljevic 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



Muhammed Baljevic M.D., a multiple myeloma specialist

countries, we continue to provide innovative treatment options, as well as specialized telepathology and second opinion consultation services for cancer care, neurology and transplantation patients around the world."

UNMC also provides no-cost, training and educational programs. "Through our customized training programs, we 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.

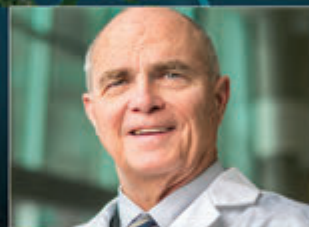
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Timesco's range of laryngoscopes have been further upgraded by the addition of LED lights for the reusable and single-use handles and standard blades.

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 as handle and blade packs, ready to use.

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

In a recent study in the 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, and approved worldwide.

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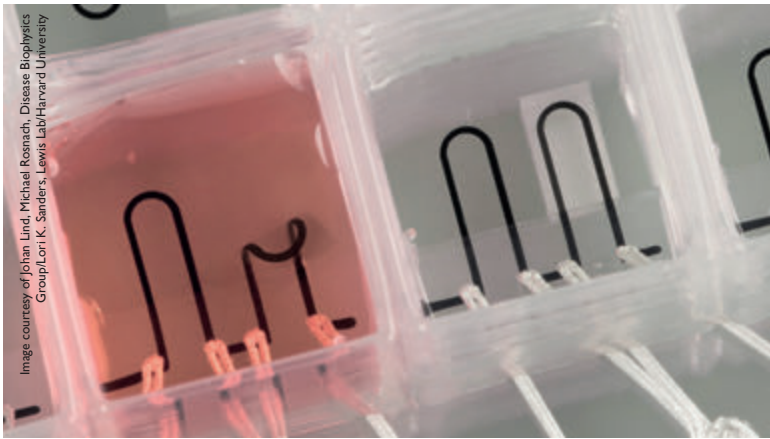
FDA approval for world's first Hybrid Closed Loop system for Type I diabetes

Medtronic announced it has received US FDA approval of its MiniMed 670G system – the first Hybrid Closed Loop insulin delivery system. Featuring the company's most advanced algorithm – SmartGuard HCL – the system is the latest innovation in Medtronic's phased approach toward developing a fully automated, closed loop system.

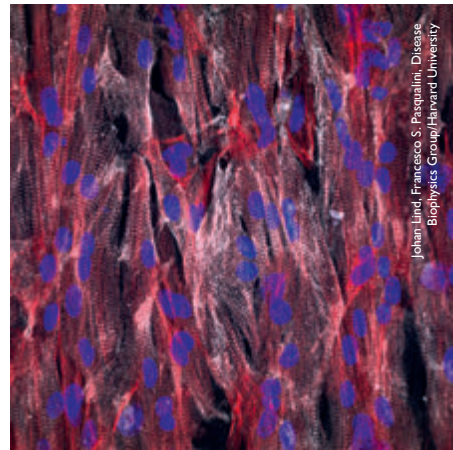
The MiniMed 670G system features the Guardian Sensor, Medtronic's newest and most advanced glucose sensor with enhanced accuracy and performance, and a longer 7-day life. The Guardian Sensor, the first and only sensor approved by the FDA to control a hybrid closed loop system, incorporates diagnostic technology that continuously monitors sensor health. Driven by the SmartGuard HCL, the system delivers a variable rate of insulin 24 hours a day based on the personalized needs of the patient, maximizing the time glucose levels are within the target range. It is designed to learn what an individual's insulin needs are and to take action to minimize both high and low glucose levels. As a result, the system requires minimal input - patients only need to enter mealtime carbohydrates, accept bolus correction recommendations, and periodically calibrate the sensor.

● For more information, visit: www.medtronic.com





The heart-on-a-chip is entirely 3D printed with built-in sensors that measure the contractile strength of the tissue, providing scientists with new possibilities for studying the musculature of the heart



Cardiac tissue self assembles on the chip, guided into place by the printed microstructures

Researchers make first complete 3D-printed heart-on-a-chip with integrated sensors

Researchers from the Wyss Institute for Biologically Inspired Engineering at Harvard University and the Harvard John A. Paulson School of Engineering and Applied Sciences (SEAS) have made the first entirely 3D-printed organ-on-a-chip with integrated sensing. Built by a fully automated, digital manufacturing procedure, the 3D-printed heart-on-a-chip can be quickly fabricated with customizable size, shape and other physical properties, providing researchers with reliable data to be easily collected for short-term and long-term studies. The study is published in *Nature Materials*.

This new approach to manufacturing may allow researchers to rapidly design organs-on-chips, also known as microphysiological systems, that match the properties of a specific disease or even an individual patient's cells.

"This new programmable approach to building organs-on-chips not only allows us to easily change and customize the design of the system by integrating sensing but also drastically simplifies data acquisition," said Johan Ulrik Lind, Ph.D., first author of the paper and postdoctoral fellow at SEAS and the Wyss Institute.

"Our microfabrication approach opens new avenues for in vitro tissue engineering, toxicology and drug screening research," said Kit Parker, Ph.D., senior coauthor of the study, who is a Wyss Core Faculty member and Tarr Family Professor of Bioengineering and Applied Physics at SEAS.

Organs-on-chips mimic the structure and

function of native tissue and have emerged as a promising alternative to traditional animal testing. Wyss Institute research teams led by Parker and Wyss Founding Director and Core Faculty member Donald Ingber, M.D., Ph.D., have developed microphysiological systems that mimic the microarchitecture and functions of lungs, hearts, tongues and intestines.

However, the fabrication and data collection process for organs-on-chips is expensive and laborious. Currently, these devices are built in clean rooms using a complex, multi-step lithographic process and collecting data requires microscopy or high-speed cameras.

"Our approach was to address these two challenges simultaneously via digital manufacturing," said Travis Busbee, coauthor of the paper and graduate student at Wyss and SEAS. "By developing new printable inks for multi-material 3D printing, we were able to automate the fabrication process while increasing the complexity of the devices."

The researchers developed six different inks that integrated soft strain sensors within the microarchitecture of the tissue. In a single, continuous procedure, the team 3D printed those materials into a cardiac microphysiological device – a heart on a chip – with integrated sensors.

"We are pushing the boundaries of three-dimensional printing by developing and integrating multiple functional materials within printed devices," said Jennifer

Lewis, Sc.D., who is a Wyss Core Faculty member and the Hansjorg Wyss Professor of Biologically Inspired Engineering at SEAS, and senior co-author of the study. "This study is a powerful demonstration of how our platform can be used to create fully functional, instrumented chips for drug screening and disease modelling."

The chip contains multiple wells, each with separate tissues and integrated sensors, allowing researchers to study many engineered cardiac tissues at once. To demonstrate the efficacy of the device, the team performed drug studies and longer-term studies of gradual changes in the contractile stress of engineered cardiac tissues, which can occur over the course of several weeks.

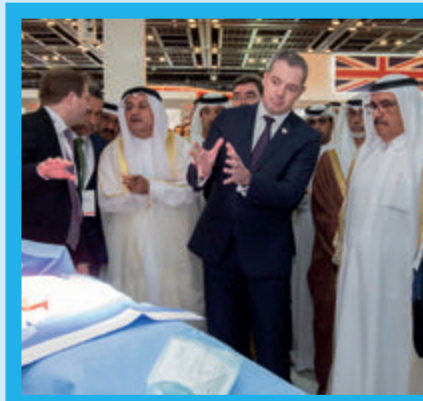
"Researchers are often left working in the dark when it comes to gradual changes that occur during cardiac tissue development and maturation because there has been a lack of easy, non-invasive ways to measure the tissue functional performance," said Lind. "These integrated sensors allow researchers to continuously collect data while tissues mature and improve their contractility. Similarly, they will enable studies of gradual effects of chronic exposure to toxins."

"Translating microphysiological devices into truly valuable platforms for studying human health and disease requires that we address both data acquisition and manufacturing of our devices," said Parker. "This work offers new potential solutions to both of these central challenges." **MEM**

Agenda

Selected schedule of regional medical meetings, conferences and exhibitions

Event	Date / City	Contact
December 2016		
International Conference on STDs and HIV	1 – 2 December, 2016 Dubai, UAE	www.clytoaccess.com/international-conference-stds-and-hiv
Cancer Care – 2016 – International Conference on Cancer care and cure	1 – 2 December, 2016 Dubai, UAE	www.clytoaccess.com/international-conference-cancer-care-and-cure
14th Global Vaccines & Vaccination Summit and Expo	5 – 6 December, 2016 Dubai, UAE	www.vaccines.global-summit.com/middleeast
4th International conference on Fitness Health and Wellness	5 – 6 December, 2016 Dubai, UAE	www.fitness.conferenceseries.com/
2nd International Conference on Central Nervous System Disorders and Therapeutics	5 – 7 December, 2016 Dubai, UAE	www.cns.conferenceseries.com/ cns@neuroconferences.com
Emirates Society of Emergency Medicine Scientific conference	7 – 10 December, 2016 Dubai, UAE	www.esemconference.ae/
16th World Cardiology Congress	8 – 9 December, 2016 Dubai, UAE	www.worldcardiology.conferenceseries.com/
International Conference on Digestive Diseases	8 – 9 December, 2016 Dubai, UAE	www.digestivediseases.conferenceseries.com/
International Conference on Health and Hospital Management	8 – 9 December, 2016 Dubai, UAE	www.hospitalmanagement.conferenceseries.com/
MENA Women's Health Congress	8 – 10 December, 2016 Dubai, UAE	www.go.evvnt.com/59070-0
The 9th Dubai International Conference for Medical Sciences	14 – 16 December, 2016 Dubai, UAE	www.hmaward.org.ae/term9/
EUSC 2016 5th Emirates International Urological Conference	15 – 17 December, 2016 Dubai, UAE	www.eusc2016.com/
International Clinical Densitometry Certification Course	16 – 17 December, 2016 Dubai, UAE	www.osteoaacegulf.org/
8th International Conference on Healthcare, Nursing and Disease Management (HNDM)	21-22 December, 2016 Dubai, UAE	www.iaphlsr.org/
International Conference on Healthcare, Applied Science, Engineering and Computer Science	29 – 30 December, 2016 Dubai, UAE	www.americanhealthcare.wix.com/ science-dubai
January 2017		
4th International Research Conference on Science, Health and Medicine 2017 (IRCSHM 2017)	4 – 5 January, 2017 Dubai, UAE	www.ircshm.com/
3rd RED SEA Ophthalmology Symposium (RSOS2017)	4 – 7 January, 2017 Jeddah, Saudi Arabia	www.rsos-jeddah.com



Agenda

Selected schedule of regional medical meetings, conferences and exhibitions

Event	Date / City	Contact
5th International Child and Adult Behavioral Health Conference	12 – 14 January, 2017 Abu Dhabi, UAE	www.menaconference.com/events/icabhc/
EROC 2017 — 7th Emirates Otorhinolaryngology Audiology and Communication Disorders Congress	18 – 20 January, 2017 Dubai, UAE	www.emiratesrhinologyandotology.ae/
Arab Health 2017	30 January – 2 February 2017 Dubai, UAE	www.arabhealthonline.com
■ February 2017		
Medlab Dubai 2017	6 – 9 February, 2017 Dubai, UAE	www.medlabme.com/
Saudi Gastroenterology Association 15th Conference & 4th SASLT Meeting 2017 (SGA 2017)	11 – 12 February, 2017 Saudi Arabia	www.saudigastro.net
5th International Child and Adult Behavioral Health Conference 2017	12- 14 January, 2014 Abu Dhabi, UAE	www.menaconference.com/events/icabhc
International Symposium on Neurovascular & Neurosurgical Disorders	12 – 15 February, 2017 Abu Dhabi, UAE	www.isnnd.com/index.php
Fourth Annual Extracorporeal Life Support Organization - The South and West Asia Chapter of (SWAC ELSO)	15 – 18 February, 2016 Doha, Qatar	www.else-swac2017.org/
2017 4TS International Conference	16 – 18 February, 2017 Dubai, UAE	www.4tsconference.com
7th Emirates Diabetes & Endocrine Congress (EDEC 2017)	16 – 18 February, 2017 Dubai, UAE	www.edec-uae.com
3rd Experts in Stone Disease Conference	16 – 18 February, 2017 Dubai, UAE	www.endourology.org/event/experts-in-stone-disease-esd/
7th Emirates Otorhinolaryngology Audiology and Communication Disorders Congress	18 – 20 January, 2017 Dubai, UAE	www.emiratesrhinologyandotology.ae
Arab African API Congress (AAAPCI)	21 – 22 February, 2017	www.aaapci.com/
10th International Conference on Healthcare, Nursing and Disease Management (HNDM)	22 – 23 February, 2017 Dubai, UAE	www.iaphlsr.org



List your conference:

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

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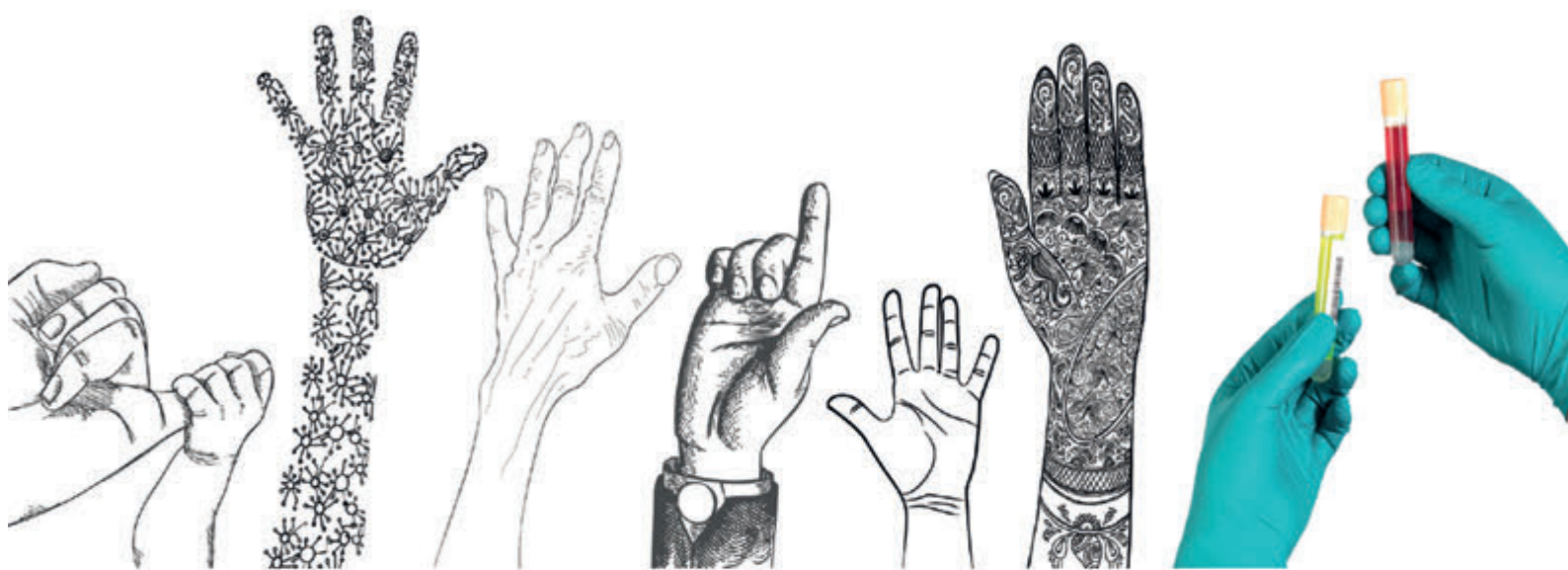
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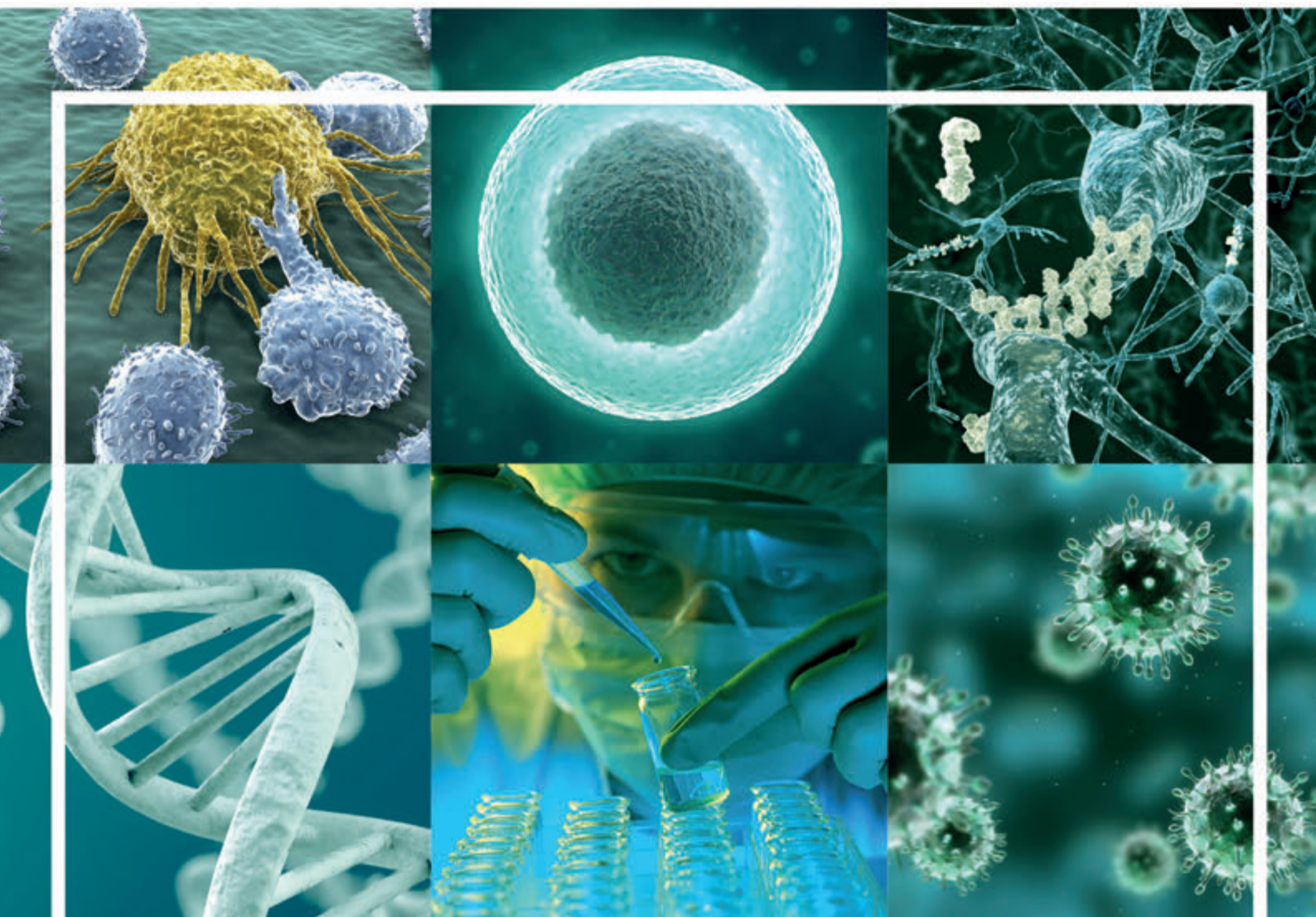
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