

Middle East HEALTH

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January - February 2021



Cardiology

Poor diet is top contributor to heart deaths globally

Cause of death

Dementia, diabetes enter WHO's top 10

Healthy living

Does biodiversity improve wellbeing?

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- Abu Dhabi spearheads launch of Hope Consortium for global COVID-19 vaccine distribution
- Cleveland Clinic Abu Dhabi surgeons perform 'awake' neurosurgery to remove tumour
- Dubai's Mediclinic City Hospital performs its first living donor kidney transplant
- Researchers discover new particle in blood of septic patients



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Prognosis

Equitable access

The COVID-19 pandemic continues to take many lives across the world and as the first vaccines roll off the manufacturing floors the demand for the inoculation is unprecedented. Wealthy countries are clearly at an advantage being in a stronger position to negotiate with pharma companies to acquire the first vaccines – and several of them have successfully done so and already begun their initial vaccination programs. Poorer countries on the other hand are left to rely on initiatives such as COVAX, and as benevolent an initiative as it is, it will in most instances provide only a limited number of vaccines sufficient only to vaccinate their frontline health workers and the most vulnerable of the population. Equitable access to SARS-CoV-2 vaccines is essential to defeating this pandemic. Clearly the poorer countries will require the assistance of the wealthier ones to achieve this goal. More needs to be done urgently in this respect. We are all in this together.

The World Health Organization recently released their Global Health Estimates. The 2019 epidemiological figures provide an important 20-year mark to assess how the leading causes of death – globally and nationally – have evolved since the dawn of the new millennium. The data provide indicators of trends that are particularly useful when deciding where to allocate limited resources. Ischemic heart disease (or coronary heart disease) remains the number one killer globally. However, it is interesting to note that Alzheimer's and other forms of dementia have entered the top 10 list of leading causes of mortality for the first time, as has diabetes. You can read more about these epidemiological trends in this issue of *Middle East Health*.

Also in this issue you will find informative articles on some of the latest research and other developments in the fields of cardiology, telemedicine and computed tomography. We trust you will enjoy this issue.

We thank our advertisers for their continued support and wish them and all our readers a happy, prosperous and healthy 2021.

Stay safe in this time of COVID.

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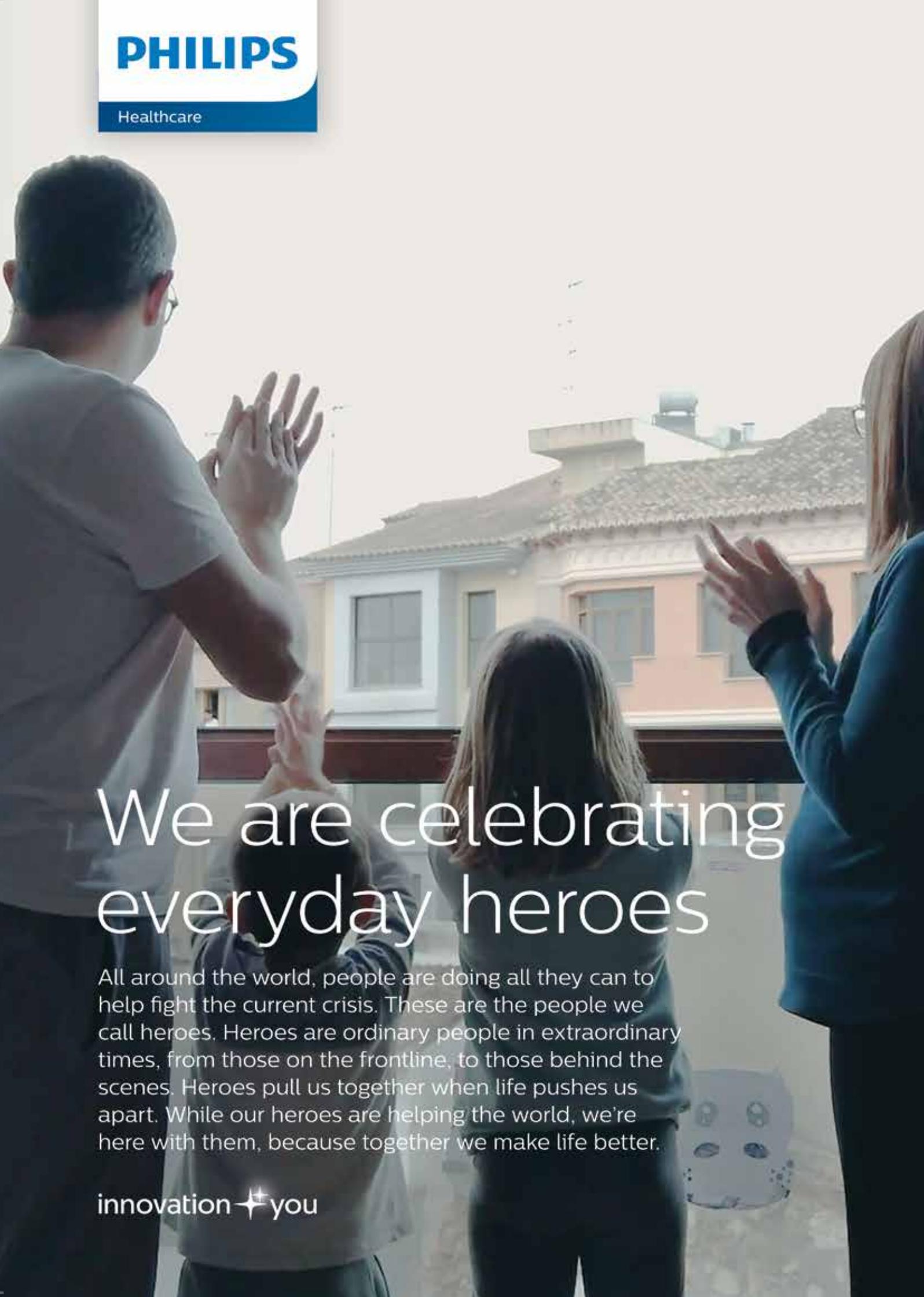


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PHILIPS

Healthcare



We are celebrating
everyday heroes

All around the world, people are doing all they can to help fight the current crisis. These are the people we call heroes. Heroes are ordinary people in extraordinary times, from those on the frontline, to those behind the scenes. Heroes pull us together when life pushes us apart. While our heroes are helping the world, we're here with them, because together we make life better.

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middle east monitor

Update from around the region



Surgeons perform 'awake' neurosurgery to remove tumour

Surgeons at Cleveland Clinic Abu Dhabi have completed a series of 'awake' neurosurgery operations, providing hope for patients suffering from brain tumours and brain disorders.

The first patient to undergo the operation, Salha Al Dhaheri, has seen significant improvements in her quality of life. During a highly specialized surgical procedure to remove a brain tumour close to critical areas that control speech and other skills, she named objects, read sentences and counted backwards from 100, enabling surgeons to be sure that they were treating the tumour without damaging vital pathways of the brain.

Through the awake brain surgery, the multidisciplinary team at the hospital was not only able to perform an almost complete resection of the tumour, but have also successfully reduced the 31-year-old Emirati's epileptic episodes while preserving her functional skills, making it a first-of-its-kind procedure to be performed in the UAE.

The team at the Neurological Institute at Cleveland Clinic Abu Dhabi has completed another three such surgeries since the first procedure and will be performing two more in the coming months.

"It was a very surreal experience to see the doctors operate while also being awake and answering questions. But there was no pain," said Salha, a school bus supervisor in Abu Dhabi.

"Now my issues of dizziness and seizures have stopped, and I can't thank the doctors enough for this miracle. I am still undergoing rehabilitation, but my quality of life has improved drastically. I am looking forward to resuming my duties as a supervisor."

Salha's debilitating seizures are a typical symptom of a tumour within the brain parenchyma (functional tissue), which were causing difficulties in speaking and sudden paralysis of her right arm. These issues indicated that her slow-growing, tumour was located very close to the language and motor cortex of the brain.

Awake neurosurgery is a preferred technique to remove tumours in functionally important regions of the brain, as it enables doctors to continually monitor the patient's function and minimizes the risks of the operation. Doctors select candidates for awake neurosurgery based on the severity of the symptoms and ensure their comfort with

the idea of waking up during surgery after several discussions with them and their family.

"Salha's tumour was in one of the most eloquent areas of her brain. The same tumour removal on the right side would have been done in a sleeping state because there would be no risk of language loss, and therefore you do not need the patient to be awake," said Dr Florian Roser, Chair of the Neurological Institute at Cleveland Clinic Abu Dhabi and one of the leading neurosurgeons in the country. "But you can only test language and higher cognitive functions when your patient is awake. When I saw Salha, I knew she would be an ideal candidate for awake surgery."

The team, including epileptologists, psychologists, intra-operative monitoring technicians, two neuro-anaesthesiologists and two neurosurgeons, conducted preliminary neurological tests and walked her and her family through the entire procedure over several days in preparation for the surgery.

For the first time, neurosurgeons in the hospital used high-definition 3-D rendered imaging sequences imported into the navigation device to map safer pathways to reach and remove the tumour, which worked like a GPS to prevent the likelihood of damaging healthy tissue. They also used a 3D printed model of Salha's brain and the tumour for presurgical planning, like positioning and approach.

"We are the only institute in the UAE to conduct functional MRI images for language and use a navigation system that illuminates the fibre tracks in the brain. We are also the only hospital to have used specifically designed Arabic-language tests so that we could assess Salha in her mother tongue during the operation. This is important because a simple English translation of the existing questionnaires can be perceived very differently by the brain," said Dr Roser.

During the part of the surgery when the doctors were approaching the brain,

Salha was unconscious, but then fully awake for three to four hours while the neurosurgeon was mapping her brain and removing the tumour. Patients can stay awake during this part of the surgery without feeling pain as the brain tissue doesn't feel any pain. The team was talking to her the entire time and instructing her to do certain motor movements while they located and removed the tumour.

Dr Eugene Achi, the neurophysiologist who was part of her care team, said that they were able to take out the epileptic zone that was triggering the seizures while she was awake, as well. "We lay a sheet of electrodes directly on the brain to pick up epileptic activity. We identified the epileptogenic zone because the patient started having sensations, but we were very careful to avoid triggering a seizure as her safety was of utmost importance."

Dr Roser concluded: "For such complex surgeries, it is very important for the team to establish a strong relationship of trust and confidence with the patient to ensure excellent results, such as we have seen in Salha's case. I'm very proud that she and her family decided to have this surgery done at home, in the UAE, which has contributed significantly to her fast recovery." [MEDI](#)

Malaffi platform to use predictive analytics technology to improve the health of Abu Dhabi residents

The Department of Health – Abu Dhabi (DOH) and Malaffi, the region's first Health Information Exchange (HIE), showcased a population risk management analytics platform at GITEX recently. The technology will empower the healthcare sector to support care management, improve population health and assist in ensuring continuity of care.

The risk management solution, which is supported and provided by Malaffi, uses advanced AI analytic

technologies such as machine learning, to build predictive models based on the clinical data and create algorithms that run in near real-time to predict cost, admissions, emergency department visits, readmissions, and diseases. Drilling down from the population to the physician and individual level, the insights will be used to predict risk, improve overall efficiencies and health outcomes.

The analytics dashboards will enable the DOH to gain insights into and manage certain risk categories such as risk of emergency room visits or complications of chronic conditions such as diabetes. It will further visualise the population risk distribution and trends and will provide benchmarking against best practice guidelines. For the first time, real-time monitoring of health indicators and new data points will be available to improve quality through customised benchmarks, in addition to standard performance and utilisation reports.

Malaffi currently connects almost 83% of all hospitals and a total of 814 healthcare facilities in Abu Dhabi, which accounts for 77% of all episodes in the Emirate. The centralised database stores 175 million patient records, for over 5 million patients.

Commenting on the new developments, Dr. Jamal Mohammed Al Kaabi, Undersecretary of the Department of Health – Abu Dhabi, said: "We are proud to have built a healthcare infrastructure that is on par with the most advanced in the world. The addition of such sophisticated analytic technology to Malaffi is further testament of the DOH's dedication to improving outcomes for the people of Abu Dhabi. Adoption of the latest technological advancements, which support further improvements to patient care, has always been a key part of our ambitious journey. Access to insights that support management of the health status of the population, will strengthen our response to public health risks and enhance the Emirate's emergency preparedness, and ultimately ensure excellence in healthcare now and in the future."

Atif Al Braiki, CEO of Abu Dhabi

Health Data Services said: "Malaffi is the first HIE in the MENA region, and thanks to the support we have had from the Abu Dhabi healthcare sector, in a short time we have demonstrated the true value that connected healthcare can offer all our stakeholders. The addition of such sophisticated analytics platforms only expands on the benefits that Malaffi offers and maximises the data collated. Advanced technologies such as this will provide insights that will empower both the DOH and healthcare providers, to improve their population health and care management efforts. The ability to analyse large data sets to identify risk at an early stage and by improving overall efficiencies, we can be one step ahead in improving quality of healthcare and outcomes for our patients. The next stage in the Malaffi journey is an exciting one." [MEDI](#)

ACC's Hani Najm Global Scholar Awards announced at Saudi Heart Association

The American College of Cardiology's (ACC) Hani Najm Global Scholar Awards program was announced at the opening session of the Saudi Heart Association Annual Conference on 8 October 2020. Part of the ACC's Campaign for the Future, the Hani Najm Global Scholar Awards will allow young cardiologists from the Middle East and North Africa regions to elevate their training by visiting hospitals in the United States for observership programs.

"The American College of Cardiology believes that non-communicable disease trends, including heart disease, are alarming, unacceptable and most importantly reversible through concerted efforts by leaders in global health, including our own organization," said John Gordon Harold, MD, MACC, chair of the ACC's Campaign for the Future and an ACC past president. "It is only through educating the next generation of cardiovascular leaders that we will ultimately reduce the burden of cardiovascular disease worldwide. The Hani Najm Global Scholar



Awards will allow young cardiologists to learn from their colleagues in the U.S., but also share effective solutions from their home institutions.”

Hani K. Najm, MD, MSc, FACC, currently serves as the chair of the ACC’s Assembly of International Governors, which consists of global cardiovascular leaders from ACC’s International Chapters, representing over 80 countries around the world. Najm will join the ACC Board of Trustees in 2021. He is the chair of paediatric and congenital heart surgery at Cleveland Clinic. Najm also served at King Abdulaziz Cardiac Center in Saudi Arabia.

“One of the most common requests from international physicians is the opportunity to train in the United States with the help of the American College of Cardiology. I feel privileged to be able to sponsor this award, as the sharing of knowledge is the best way to combat the devastating effects of cardiovascular disease worldwide,” Najm said.

Recipients of the Hani Najm Global Scholar Awards will allow two early career cardiologists – one from a Gulf country and one from another Middle East or North African country – to visit the U.S. for a four-week observership at a major health system, which will culminate with attendance at that year’s ACC Annual Scientific Session. Award winners will be invited to Early Career Section programming and be recognized during Convocation.

The Hani Najm Global Scholar Awards are currently scheduled to be awarded annually from 2022-2025. 

Mediclinic City Hospital performs first living donor kidney transplant surgeries

Dubai’s Mediclinic City Hospital, in partnership with Mohammed Bin Rashid University of Medicine and Health Sciences (MBRU) and Al Jalila Children’s Specialty Hospital, carried out the first living donor kidney transplant surgeries under the MBRU Organ Transplant Program, making it the first for Mediclinic

City Hospital and Al Jalila Children’s.

The first surgery was performed on 14 November on a 34-year-old patient who had been on peritoneal dialysis since January 2019 and on the transplant waiting list since July 2019. He underwent successful transplant surgery using a kidney from a live donor who is his wife’s 23-year-old brother.

The second surgery was performed on 17 November on a 41-year-old Emirati female patient who was suffering from polycystic kidney disease. Because of her deteriorated kidney function, she had started haemodialysis in September 2020. She found a donor, her 36-year-old old brother, who was a suitable match.

Under the care of a multidisciplinary team of surgeons, nephrologists and nurses, the recipients and donors of both transplant surgeries were discharged within 10 days and are doing well without any complications.

Dr Farhad Janahi, Assistant Professor of Surgery at MBRU and Consultant Urological and Transplant Surgeon at Mediclinic City Hospital, said: “Performing living donor kidney transplants is a new dawn for our patients with kidney failure and asserts our medical and surgical teams’ capabilities.”

“The success of performing these live donor transplants in Dubai is an ultimate demonstration of collaboration and team efforts of three institutions, pulling together all their resources and delivering the best healthcare for patients suffering from end stage renal disease,” commented Dr Waldo Concepcion, Consultant Transplant Surgeon at Al Jalila Children’s Specialty Hospital.

Dr Ramzi Ayache, Consultant Nephrologist at Mediclinic City Hospital added: “In our continuous effort to support our patients with kidney failure and their families, the launch of the living kidney donor transplant program aims to shorten the time the patient spends on a donor waiting list, improve long term kidney survival because of a better genetic matching, avoid initiation of dialysis when possible and schedule in advance the day of transplantation when donor and patient are ready.”

He explained: “After a strict evaluation before approval, the family member will

donate only one kidney to his relative with failed kidneys. The remaining kidney compensates for the loss of one kidney and allows him to have a normal life. Even though the long-term risk of kidney donation is minimal when compared with the health risks in the general population, we recommend that the donor follows a healthy lifestyle and has a medical checkup annually.

“The benefit of live donation is obvious for the patient for the reasons cited above but also for the donor, as studies showed that donors tend to have higher quality of life after donation, with more self-esteem and increased sense of well-being by helping their loved ones.”

Transplants in less than 10 days

Earlier in December the UAE Ministry of Health and Prevention announced the success of a living kidney transplant surgery on a 20-year-old-patient at Al Qassimi Hospital Sharjah. Surgeons from the MBRU Transplant Program, Dr Farhad Janahi and Dr Waldo Concepcion, led the surgery in collaboration with the medical team at Al Qassimi Hospital.

MBRU joined forces with Al Qassimi Hospital earlier this year to support its accreditation as a kidney transplant center. This collaborative effort is an illustration of the objective of the MBRU Transplant Program which aims to establish through partnerships with healthcare providers services for organ transplantation to meet the growing demand in the country, help those patients by increasing the number of organ transplantation in the UAE which eventually improves the quality of life of those patients and their families. The MBRU Transplant Program works in partnership with the National Transplant Program of the Ministry of Health and Prevention.

In the beginning of the year, MBRU, Mediclinic Middle East and Al Jalila Children’s signed a tripartite agreement to collaborate and work together to support the organ transplant efforts in the country under the MBRU Organ Transplant Program. Today, the 3 institutions act as one front in this effort. 

A team of scientists from Gladstone, UC Berkeley, and UC San Francisco, including Dr Melanie Ott (left) and Parinaz Fozouni (right), outlined the technology for a rapid, one-step mobile test that could help combat the pandemic.



New CRISPR-based test for Covid-19 uses a smartphone camera

Imagine swabbing your nostrils, putting the swab in a device, and getting a read-out on your phone in 15 to 30 minutes that tells you if you are infected with the Covid-19 virus. This has been the vision for a team of scientists at Gladstone Institutes, University of California, Berkeley (UC Berkeley), and University of California, San Francisco (UCSF). And now, they report a scientific breakthrough that brings them closer to making this vision a reality.

One of the major hurdles to combating the Covid-19 pandemic is the availability of mass rapid testing. Knowing who is infected would provide valuable insights about the potential spread and threat of the virus for policymakers and citizens alike.

Yet, people must often wait several days for their results, or even longer when there is a backlog in processing lab tests. And, the situation is worsened by the fact that most infected people have mild or no symptoms, yet still carry and spread the virus.

In a new study published in the scientific journal *Cell*, the team from Gladstone, UC Berkeley, and UCSF has outlined the technology for a CRISPR-based test for Covid-19 that uses a smartphone camera to provide accurate results in under 30 minutes.

“It has been an urgent task for the scientific community to not only increase testing, but also to provide new testing options,” says Melanie Ott, MD, PhD, director of the Gladstone Institute of Virology and one of the leaders of the study. “The assay we developed could provide rapid, low-cost testing to help control the spread of COVID-19.”

The technique was designed in collaboration with UC Berkeley bioengineer Daniel Fletcher, PhD, as well as Jennifer Doudna, PhD, who is a senior investigator at Gladstone, a professor at UC Berkeley, president of the Innovative Genomics Institute, and an investigator of the Howard Hughes Medical Institute. Doudna recently won the 2020 Nobel Prize in Chemistry for co-discovering CRISPR-Cas genome editing, the technology that underlies this work.

Not only can their new diagnostic test generate a positive or negative result, it also measures the viral load in a given sample.

“When coupled with repeated testing, measuring viral load could help determine whether an infection is increasing or decreasing,” says Fletcher, who is also a Chan Zuckerberg Biohub Investigator. “Monitoring the course of a patient’s infection could help health care professionals estimate the stage of infection and predict, in real time, how long is likely

needed for recovery.”

“One reason we’re excited about CRISPR-based diagnostics is the potential for quick, accurate results at the point of need,” says Doudna. “This is especially helpful in places with limited access to testing, or when frequent, rapid testing is needed. It could eliminate a lot of the bottlenecks we’ve seen with Covid-19.”

“What really makes this test unique is that it uses a one-step reaction to directly test the viral RNA, as opposed to the two-step process in traditional PCR tests,” says Dr Ott, who is also a professor in the Department of Medicine at UCSF. “The simpler chemistry, paired with the smartphone camera, cuts down detection time and doesn’t require complex lab equipment. It also allows the test to yield quantitative measurements rather than simply a positive or negative result.”

The researchers also say that their assay could be adapted to a variety of mobile phones, making the technology easily accessible.

“We chose to use mobile phones as the basis for our detection device since they have intuitive user interfaces and highly sensitive cameras that we can use to detect fluorescence,” explains Fletcher. “Mobile phones are also mass-produced and cost-effective, demonstrating that specialized lab

instruments aren't necessary for this assay."

When the scientists tested their device using patient samples, they confirmed that it could provide a very fast turnaround time of results for samples with clinically relevant viral loads. In fact, the device accurately detected a set of positive samples in under 5 minutes. For samples with a low viral load, the device required up to 30 minutes to distinguish it from a negative test.

Not only does the new CRISPR-based test offer a promising option for rapid test-

ing, but by using a smartphone and avoiding the need for bulky lab equipment, it has the potential to become portable and eventually be made available for point-of-care or even at-home use. And, it could also be expanded to diagnose other respiratory viruses beyond SARS-CoV-2.

In addition, the high sensitivity of smartphone cameras, together with their connectivity, GPS, and data-processing capabilities, have made them attractive tools for diagnosing disease in low-resource regions.

"We hope to develop our test into a device that could instantly upload results into cloud-based systems while maintaining patient privacy, which would be important for contact tracing and epidemiologic studies," Dr Ott says. "This type of smartphone-based diagnostic test could play a crucial role in controlling the current and future pandemics."

Reference:

<https://doi.org/10.1016/j.cell.2020.12.001> 

Long-Covid: symptoms persist in one third of cases

Since its appearance in early 2020, Covid-19 has been unpredictable for both physicians and affected individuals given the variety and duration of its symptoms. Notably, it appears to have the potential to cause an unusually long-lasting illness, and the term "long Covid" describes the disease in people who continue to report symptoms several weeks following the infection. To better understand this phenomenon, a team of physicians and epidemiologists from the University of Geneva (UNIGE) the University Hospitals of Geneva (HUG) and the General Health Directorate of the State of Geneva followed nearly 700 people who tested positive for SARS-COV-2 but did not require hospitalisation.

Six weeks after diagnosis, 33% of them still reported suffering from fatigue, loss of smell or taste, shortness of breath or cough. These results, which can be seen in the *Annals of Internal Medicine*, call for better communication, particularly with patients and with the physicians who follow them, and for ongoing messages to the general public, reminding them that SARS-CoV-2 infection is not trivial.

Even if in just a few months medical and scientific knowledge about SARS-COV-2 has considerably improved, several aspects of this disease remain unknown. In particular, many people are wondering about the evolution and long-term consequences of this novel virus.

"As soon as the pandemic arrived in our country, we were confronted with these questions," reports Professor Idris Guessous, physician epidemiologist at the Department of Community Health and Medicine of the UNIGE Faculty of Medicine and Chief Physician of the Division of Primary Care at HUG, who directed this work. "In March, the COVICARE program was set up to offer remote monitoring to patients who can be followed on an outpatient basis, when this follow-up could not be carried out by the primary care physician. This has enabled us to better understand the evolution of the disease in people who generally suffer neither from specific risk factors nor from a serious form of the disease."

A total of 669 people were followed (mean age 43 years, 60% female, 25% of healthcare professionals and 69% without underlying risk factors that could be related to complications from Covid-19). At 6 weeks from diagnosis, nearly a third of participants still had one or more symptoms related to Covid-19, mainly fatigue (14%), shortness of breath (9%) and loss of taste or smell (12%). In addition, 6% reported a persistent cough and 3% reported headaches. Dr Mayssam Nehme, Senior Resident in Professor Guessous's team and first author of this work, also explains how these patients felt: "In addition to the physical distress of their symptoms, many were very worried: how much longer

would it last? Were some after-effects irrecoverable? Even without a clear medical answer, in the current state of knowledge, it is important to accompany concerned patients and to listen to them," she adds. With this in mind, the HUG has set up a specific consultation for long Covid patients in order to improve their care and guide them through the health system.

The persistence of symptoms must be recognised in order to legitimise the concerns of patients faced with a new and unknown disease, and to optimise their management. "This requires an information campaign towards the general public and healthcare workers, but also, more broadly, among employers, insurance companies and society in general. Everyone should realise that previously healthy people can also be affected by Covid-19, weeks or even months following the infection. Prevention is therefore of the utmost importance," add the authors, who are continuing their studies to understand the long-term evolution of these patients. Indeed, a follow-up of the same cohort 3 months, 7 months and 12 months following the infection is in progress.

Reference:

Covid-19 Symptoms: Longitudinal Evolution and Persistence in Outpatient Settings, *Annals of Internal Medicine*. <https://doi.org/10.7326/M20-5926> 

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Abu Dhabi spearheads launch of Hope Consortium for global vaccine distribution

Amid an anticipated surge in vaccine logistics demand, Abu Dhabi is poised to cement its position as the global logistics hub to facilitate Covid-19 vaccine distribution across the world, after spearheading the launch of the Hope Consortium.

Comprising leading Abu Dhabi and global entities, the Hope Consortium represents a complete supply chain solution to address vaccine transport, demand planning, sourcing, training, and digital technology infrastructure, and facilitate vaccine availability across the world.

The news follows Hope Consortium member Etihad Cargo and the consortium transporting five million vaccines in November on behalf of the Department of Health – Abu Dhabi, which is spearheading the consortium and will oversee regulatory compliance, full chain expertise and scientific insight. The consortium also includes Abu Dhabi Ports Group, Rafed, the healthcare purchasing arm of Abu Dhabi-based ADQ, and Switzerland's award-winning SkyCell, which develops next-generation, temperature-controlled logistics containers for the pharmaceutical industry. As part of the Hope Consortium, SkyCell will establish a regional service and manufacturing centre in Abu Dhabi.

The Hope Consortium has pooled its collective expertise to garner a multi-faceted capability to provide logistics services to handle over six billion doses from the vaccines being developed and manufactured around the world – whether in single or multi doses – in cold and ultra-cold conditions in 2021, rising to over three times more doses by the end of next year – the largest capacity and logistics capability regionally and one of the largest globally.

“The Hope Consortium is a prime example of how Abu Dhabi is leading in providing solutions, capabilities and capacities to help the world get through this global pandemic. It is a continuation of all players’ collaboration of a UAE-based public-private partnership that spans the globe. While assuring vaccine supply to the domestic market, the Hope Consortium will



offer international governments, non-governmental organisations, and vaccine suppliers a cohesive solution across every supply chain step – from air freight, regional storage and temperature monitoring, to inventory management, cold and ultra-cold container solution, regulatory clearance, and healthcare and pharma quality assurance,” explained Sheikh Abdullah bin Mohammed Al Hamed, chairman of the Department of Health – Abu Dhabi.

“Developing a vaccine is only the first step in getting to a solution, getting that vaccine to the whole globe, while maintaining a robust integrity of temperature is an equal challenge by itself, the Hope Consortium will provide that solution on the highest level of quality.

“Consortium partners already have extensive expertise in the global delivery of millions of Covid-19 related items, such as personal protective equipment, diagnostics consumables, vaccines and pharmaceuticals. As we progress talks with vaccine manufacturers to apprise them of our global distribution capabilities, the Hope Consortium will harness the united expertise of various Abu Dhabi and UAE stakeholders to provide a fully-fledged, end-to-end solution specifically for Covid vaccine distribution needs.”

Distribution of the vaccines, which will be stored in Abu Dhabi Ports Company facilities, will be carried out by Etihad Cargo, the first Middle Eastern carrier to

gain IATA's Centre of Excellence for Independent Validators (CEIV) certification for pharmaceutical logistics. The UAE's national carrier will leverage its extensive intercontinental network, fleet and charter flights to supply vaccines globally.

“With two thirds of the world's human footprint within a four-hour flight of Abu Dhabi, the UAE capital's investment in technological expertise and world-class infrastructure facilities means we can serve as a global logistical hub to, and for, the world,” explained Tony Douglas, Group Chief Executive Officer, Etihad Aviation Group.

“Etihad Cargo's role in the consortium will leverage our outstanding pharmaceutical logistics expertise and specialised pharma and healthcare service, PharmaLife, the IATA CEIV Pharma certified product capable of facilitating temperature-sensitive cargo between +25 C and -80 C. Our network reach across key destinations will be supported by the utilisation of our charter operations to meet global demand for swift and secure Covid-19 vaccine shipments.

The Hope Consortium intends to transport the vaccines using SkyCell's hybrid containers. The storage and transportation containers are secured through an IoT monitoring service which tracks temperature conditions to ensure sensitive vaccines are protected even under extreme conditions. MEH

Maintaining safe IV infusion therapy during the COVID-19 pandemic

Smart pumps with Dose Error Reduction Systems (DERS) reduce the risk of medication error, but the requirement for strict isolation of large numbers of patients during the COVID-19 pandemic has made maintaining the *Rights* of IV medication administration increasingly difficult.

Right Maintenance of continuous critical short half-life infusions (CSHLI), such as Noradrenaline or Glyceryl Trinitrate is also vital as any prolonged interruption of CSHLI delivery could be fatal, and nursing staff must respond promptly to any infusion alarm if serious cardiovascular events are to be avoided. Centralised monitoring of infusions can significantly reduce nurse reaction times to CSHLI alarms.

To reduce nursing time inside SARS-CoV-2 patient rooms we can use long extension lines that allow the patient's pumps to remain outside of the isolation room. Running the IV line under the door and across the room's floor, with taping to prevent tripping or dislodgment, is not ideal but provides protection of the line. However, the technique may cause issues of pressure gradient changes affecting occlusion alarms, and accumulation of air in the line due to the low level of the line in relation to the pump and the patient.

Long lines increase siphonage in the case of large bore lines and increase downstream pressure when microbore lines are used. It is important to maintain the recommended height of the infusion bag above a large volume pump (this is usually 50 centimetres) and any unnecessary resistance in the downstream line should be reduced by limiting the number of extension-set additions whilst achieving a safe working distance, and infusing through as large an IV catheter as possible. Priming of long extension lines can be undertaken by gravity, but it is often easier to control the prime by using the pump. Downstream



occlusion pressure limits may need to be increased to avoid nuisance alarms, particularly at higher rates with narrow tubing. This can be done by bedside-users, but with wireless-connected smart pumps changes to default pressure alarm configurations can be made centrally and distributed rapidly via the network to all pumps.

Studies on the cleaning of long-lines and their materials suggest that wiping a PVC extension set 2-3 times daily with 70% isopropyl alcohol solution has minimal impact on the line's function and performance (i.e. there will be no weakening leading to excess kinking or excessive compliance in the line). It is therefore expected that PVC IV extension sets would still deliver their critical function with minimal risk to clinician or patient.

For intermittent infusions nurses should consider priming long extension-sets with the medication rather than with normal-saline or dextrose, to facilitate prompt delivery. Post-medication flushes should be given at the same rate as the medication, the pump's 'restore' function can help achieve this.

Appropriate cleaning and decontamina-

tion of pumps between patients, and on a regular basis, is a both vital component of pandemic planning, as well as being central to any 'standard' infection control plan. Selection of infusion pumps is a factor here. There should be no difficult to access areas that can harbour contaminant and that cannot be exposed to disinfectant material. This includes plunger grips on syringe pumps and line or cartridge loading spaces on large volume pumps. Furthermore, the pump's body must be not be degraded by cleaning products that can fight SARS-CoV-2. New polymers released in the last few years by some pump manufacturers have considerably broadened the cleaning products that can be used without fear of damage to the device. MEH

Becton Dickinson

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the laboratory

Medical research news from around the world

Researchers find baby's first breath turns on gene to regulate breathing

There are few moments in life as precious, as critical and as celebrated as baby's first breath. New research from the University of Virginia's (UVA) School of Medicine sheds light on the lifelong changes in breathing systems that occur precisely with that first breath – and may offer important insights into Sudden Infant Death Syndrome (SIDS).

A team of researchers led by UVA's Yingtang Shi, MD; Patrice Guyenet, PhD; and Douglas A. Bayliss, PhD, have discovered a signalling system within the brainstem that activates almost immediately at birth to support early breathing. That first gasp that every parent cherishes appears to trigger this support system.

"Birth is traumatic for the newborn, as the baby has to independently take control over various important body functions, including breathing," said Bayliss, chairman of UVA's Department of Pharmacology. "We think that activation of this support system at birth provides an extra safety factor for this critical period."

Regulating baby's breathing

The new findings help researchers understand how breathing transitions from a fragile state susceptible to brain-damaging and potentially deadly pauses early in development to a stable and robust physiological system that flawlessly supplies the body with oxygen for the rest of our lives. Before a baby is born, breathing is not required and breathing movements occur only intermittently, so the transition at birth can be a highly vulnerable time.

Bayliss and his colleagues at UVA, working with researchers at the University of Alberta and Harvard University, found that a specific gene is turned on immediately at birth in a cluster of neurons that regulate breathing selectively in mice. This gene produces a peptide neurotransmitter – a chain of amino acids

that relays information between neurons. This transmitter, called PACAP, starts to be released by these neurons just as the baby emerges into the world.

The scientists determined that suppressing the peptide in mice caused breathing problems and increased the frequency of apneas, which are potentially dangerous pauses in breathing. These apneas further increased with changes in environmental temperature. These observations suggest that problems with the neuropeptide system may contribute to Sudden Infant Death Syndrome (SIDS).

Understanding SIDS

SIDS, also known as crib death, is the sudden unexplained death of a child less than a year of age. It is the leading cause of infant mortality in Western countries. SIDS is attributed to a combination of genetic and environmental factors, including temperature. UVA's new research suggest that problems with the neuropeptide system may increase babies' susceptibility to SIDS and other breathing problems.

PACAP is the first signalling molecule shown to be massively and specifically turned on at birth by the breathing network, and it has been linked genetically to SIDS in babies. The causes of SIDS likely are complex, and there may be other important factors to discover, the researchers note.

"These finding raise the interesting possibility that additional birth-related changes may occur in the control systems for breathing and other critical functions," Bayliss said. "We wonder if this could be something that has been selected for more generally – activation of fail-safe support systems for this key transition period. Understanding those might help us better treat disorders of the newborn."

Reference:

Shi, Y., Stornetta, D.S., Reklow, R.J. et al. A brainstem peptide system activated at birth protects postnatal breathing. *Nature* (2020).

• doi: <https://doi.org/10.1038/s41586-020-2991-4> 

Researchers discover new particle in blood of septic patients

Researchers at La Jolla Institute for Immunology (LJI) have found that people with sepsis have never-before-seen particles in their blood. The scientists are the first to show that these particles, called elongated neutrophil-derived structures (ENDS), break off of immune cells and change their shape as they course through the body.

"We actually found a new particle in the human body that had never been described before," explained LJI Instructor Alex Marki, M.D., who served as first author of the study. "That's not something that happens every day."

The research, published 4 December 2020 in the *Journal of Experimental Medicine* shows the importance of understanding how immune cells change over the course of a disease.

"ENDS are not normal – they are not detectable in healthy people or mice," said LJI Professor Klaus Ley, M.D., who served as senior author of the study. "But ENDS are very high in sepsis, and I would not be surprised if they were high in other inflammatory diseases."

The beginning of the ENDS

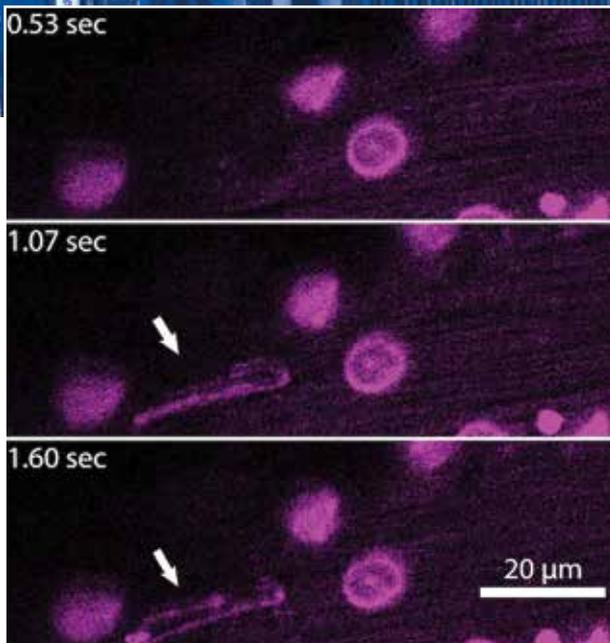
The discovery of ENDS started with an odd observation.

Marki was studying neutrophils, a kind of immune cell that moves through the bloodstream and slips into tissues to fight infections. At the time, he was studying living mice to confirm the presence of tubes called tethers. These tethers are attached to neutrophils as they roll on the blood vessel wall.

During these experiments Marki noticed long, thin objects of neutrophil origin sticking to the vessel wall. Since no such structure was described in the scientific literature, the team had to come up with a name for them. The initial lab slang name "sausages" was eventually replaced by the elongated neutrophil-derived structures or ENDS.



Image courtesy of Alex Marki, MD, Ley Laboratory, La Jolla Institute for Immunology.



Keen to learn more about these new objects, the LJI team developed a series of new techniques to study how ENDS form and degrade – and to detect them in human and mouse blood plasma.

Thanks to sophisticated imaging techniques, the LJI team figured out that tethers become ENDS. As the neutrophils flop and roll along, their tethers get longer and longer. Eventually the tethers become too thin – just 150 nanometres (around 1/500th the width of a human hair). Then they break in the middle. Part of the tether stays with the neutrophil, but the broken fragment flies away in the bloodstream, off to form an ENDS.

The researchers showed that these ENDS curl against the vessel wall until they get a rounded shape. It's likely that the ENDS stay intact for a while, but not for long. Without any life-sustaining organelles inside, the ENDS begin to die. In fact, the researchers found that the ENDS secrete tell-tale signalling molecules that promote inflammation.

Compared with healthy subjects, the researchers showed that ENDS are around 100-fold more detectable in septic patients.

Sepsis can occur when the immune system overreacts to an infection by flooding the body with dangerous chemicals. Instead of just fighting the infection, these chemicals trigger organ damage as they course through the bloodstream. The mortality rate for septic “shock” is 30 percent.

“Once you're in the hospital, sepsis is the most common cause of death,” Ley said.

change,” he said.

Ley said it is theoretically possible that ENDS could one day serve as a biomarker for early sepsis detection, but it is currently impossible to detect them in a clinical setting. “Right now, the assay is not practical because it takes specialized instrumentation,” said Ley.

Rather than serving as a diagnostic, Ley thinks studying ENDS could reveal secrets to how the immune system evolved. He's curious to learn how the process to form ENDS evolved and why.

“Neutrophils are very soft cells that can deform to reach almost any place in the body,” said Ley. “So one hypothesis I have is that ENDS might be the price you pay for having such a soft cell – that if you pull too hard, it falls apart.”

Reference:

“Elongated neutrophil-derived structures are blood-borne microparticles formed by rolling neutrophils during sepsis. *Journal of Experimental Medicine*.

• doi: <http://doi.org/10.1084/jem.20200551>

New drug molecules hold promise for treating rare inherited terminal childhood disease

Scientists at the University of Exeter have identified a way to “rescue” cells that have genetically mutated, paving the way to a possible new treatment for rare terminal childhood illness such as mitochondrial disease.

The research, funded by the United Mitochondrial Disease Foundation in the USA, was led by Professors Matt Whiteman and Tim Etheridge. In the study, published in the *Journal of Inherited Metabolic Disease*, the team used novel drugs being developed at the University of Exeter, which “metabolically reprogramme” mitochondria, the cellular energy production centres in cells, by providing them with an alternative fuel source to generate metabolic energy in the form of minute quantities of hydrogen sulphide. The team used microscopic worms (*C. elegans*) with specific genetic mutations affecting energy production, that match mutations that cause human diseases such as Leigh Syndrome. The team found that administering the new compounds to these animals successfully normalised or improved energy production needed to keep them healthy and active.

Prof Etheridge, of the University of Exeter, one of the study authors, said: “Worms are a very powerful genetic tool to study human health and disease and offer an ideal platform to quickly identify new potential therapeutics. The worms used in this study had genetic defects in how their mitochondria regulate cellular energy production to model different human mitochondrial diseases. The novel compounds we are developing at the University of Exeter are able to bypass some of these defects and keep the worms, and their mitochondria healthy. We know this because we saw improvements in physical activity and improvements in muscle and mitochondrial integrity. The animals also lived for longer after treatment but more importantly, they remained active for longer, because of metabolic reprogramming.”

The team had previously shown that the compounds had potent therapeutic effects in mammalian models with defective mitochondria. In those studies, the animals' mitochondria became defective as result of a disease process. In the latest study however, the defective mitochondria were the direct cause of the disease, as in human mitochondrial disease and were still success-



fully treated with the Exeter compounds. The fact that the compounds could reverse some of these inherited defects in energy metabolism strongly suggest that their effect will translate to humans, and the team is confident this can be tested in the near future.

Lead author Prof Whiteman, of the University of Exeter, said: “Mitochondrial diseases, and their related conditions, are areas of huge and desperate unmet clinical need. Our study is an important first step and a lot of work still needs to be done. For the first time, we have demonstrated that our new molecules have successfully metabolically reprogrammed, or rescued, cells in animals with genetic defects in their mitochondria. We’re currently testing newer and more potent molecules able to do the same task, through slightly different approaches, and we’re looking for commercial partners to help our efforts to progress our molecules through to clinical testing.”

Reference:

The mitochondria-targeted hydrogen sulfide donor AP39 improves health and mitochondrial function in a *C. elegans* primary mitochondrial disease model. *Journal of Inherited Metabolic Disease*. 15 December 2020.

• doi: <https://doi.org/10.1002/jimd.12345> 

Development of new stem cell type may lead to advances in regenerative medicine

A team led by University of Texas (UT) Southwestern has derived a new “intermediate” embryonic stem cell type from multiple species that can contribute to chimeras and create precursors to sperm and eggs in a culture dish.

The findings, published in *Cell Stem Cell*, could lead to a host of advances in basic biology, regenerative medicine, and reproductive technology.

Cells in early embryos have a range of distinct pluripotency programs, all of which endow the cells to create various tissue types in the body, explained study leader Jun Wu,

Ph.D., assistant professor of molecular biology. A wealth of previous research has focused on developing and characterizing “naïve” embryonic stem cells (those about four days post-fertilization in mice) and “primed” epiblast stem cells (about seven days post-fertilization in mice, shortly after the embryo implants into the uterus).

However, says Wu, there’s been little progress in deriving and characterizing pluripotent stem cells (PSCs) that exist between these two stages – largely because researchers have not been able to develop a paradigm for maintaining cells in this intermediate state. Cells in this state have been thought to possess unique properties: the ability to contribute to intraspecies chimeras (organisms that contain a mix of cells from different individuals of the same species) or interspecies chimeras (organisms that contain a mix of cells from different species) and the ability to differentiate into primordial germ cells in culture, the precursors to sperm and eggs.

For this study, the researchers successfully created intermediate PSCs, which they named “XPSCs” from mice, horses, and humans.

Wu said that these results could eventually lead to an array of advances in both basic and applied research. For example, looking at gene activity in XPSCs from different species and interspecies chimeras could help researchers understand which signatures have been conserved through evolution. Examining the communication between cells in chimeras may help scientists identify strategies that could be used to accelerate the development of tissues and organs from stem cells used for transplantation. And using chimera-derived primordial germ cells to create sperm and eggs could aid in preserving endangered animal species and advancing infertility treatments.

“These XPSCs have enormous potential. Our study helps open the door to each of these possibilities,” said Wu, who is a Virginia Murchison Linthicum Scholar in Medical Research.

Wu noted that developing XPSCs presented a special challenge because the conditions that keep naïve PSCs in a stable state

are exactly the opposite from those that stabilize primed PSCs. While culture conditions for naïve PSCs must activate a WNT cell-signalling pathway and suppress the FGF and TGF- β pathways, the conditions to maintain primed PSCs must suppress WNT and activate FGF and TGF- β .

Aiming for the preferred environment for XPSC derivation, Wu and his colleagues placed cells from early mouse embryos into cultures containing chemicals and growth factors that activate all three pathways. These lab-grown cells were extremely stable in culture and able to multiply without developing any further for approximately two years.

Chimeras

Additional experiments showed that these cells met the expectations researchers have long strived to meet of contributing to chimeras and directly differentiating into primordial germ cells. Wu and his colleagues made intraspecies chimeras of mice using cells derived from mice with different coat colours by injecting the cells into early mouse embryos. They also tracked the contributions of the XPSCs by tagging the cells with a fluorescent protein and then identifying them throughout the resulting offspring’s body.

Wu’s team made interspecies chimeras by injecting horse XPSCs into early mouse embryos and allowing the embryos to develop in mice for several days. Surprisingly, although horses have a comparatively long gestational period – nearly a year – the researchers found that these foreign cells had contributed to mouse organ development, indicating that signals from the mouse cells determine organ developmental timelines.

Like XPSCs from other species, the human cells showed that they were capable of differentiating into a variety of tissues if culture conditions allowed them to progress in development, as well as directly form primordial germ cells in a dish.

Reference:

Derivation of Intermediate Pluripotent Stem Cells Amenable to Primordial Germ Cell Specification. *Cell Stem Cell*.

• doi: <https://doi.org/10.1016/j.stem.2020.11.003> 



MADE IN JAPAN

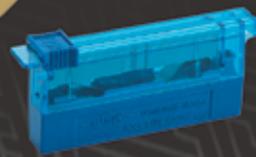
Cutting-Edge Technology Sharpened in Japan



Micro Scalpels
for Ophthalmology



Disposable
Microtome
Blades
and Holders
for Pathology



Micro Blades
for Fine Incision



The Feather
Cutting Instrument
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9001-Cutting Tool
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Alzheimer's disease and other forms of dementia are now among the top 10 causes of death worldwide.



Rad Cyrus / unsplash

WHO releases 2019 Global Health Estimates

Heart disease remains number 1 killer worldwide; diabetes and dementia enter top 10

Noncommunicable diseases now make up seven of the world's top ten causes of death, according to WHO's 2019 Global Health Estimates, published 9 December 2020. This is an increase from four of the ten leading causes in 2000. The new data cover the period from 2000 to 2019 inclusive.

The estimates reveal trends over the past two decades in mortality and morbidity caused by diseases and injuries. They clearly highlight the need for an intensified global focus on preventing and treating cardiovascular diseases, cancer, diabetes and chronic respiratory diseases, as well as tackling injuries, in all regions of the world, as set out in the agenda for the UN Sustainable Development Goals.

While it is important to know why people die, it is equally important to know how people live. Monitoring how many people die each year – and how many years of healthy life were lost due to disability – helps to assess the effectiveness of health

systems and support timely and effective decision-making.

“These new estimates are another reminder that we need to rapidly step up prevention, diagnosis and treatment of noncommunicable diseases,” said Dr Tedros Adhanom Ghebreyesus, Director-General of WHO. “They highlight the urgency of drastically improving primary health care equitably and holistically. Strong primary health care is clearly the foundation on which everything rests, from combatting noncommunicable diseases to managing a global pandemic.”

Heart disease

Heart disease has remained the leading cause of death at the global level for the past 20 years. However, it is now killing more people than ever before. The number of deaths from heart disease increased by more than 2 million since 2000, to nearly 9 million in 2019. Heart disease now represents 16% of total deaths from all

causes. More than half of the 2 million additional deaths were in the WHO Western Pacific region. Conversely, the European region has seen a relative decline in heart disease, with deaths falling by 15%.

Alzheimer's

Alzheimer's disease and other forms of dementia are now among the top 10 causes of death worldwide, ranking 3rd in both the Americas and Europe in 2019. Women are disproportionately affected: globally, 65% of deaths from Alzheimer's and other forms of dementia are women.

Diabetes

Deaths from diabetes increased by 70% globally between 2000 and 2019, with an 80% rise in deaths among males. In the Eastern Mediterranean, deaths from diabetes have more than doubled and represent the greatest percentage increase of all WHO regions.

Pneumonia

In 2019, pneumonia and other lower respiratory infections were the deadliest group of communicable diseases and together ranked as the fourth leading cause of death. However, compared to 2000, lower respiratory infections were claiming fewer lives than in the past, with the global number of deaths decreasing by nearly half a million.

HIV/AIDS

This reduction is in line with a general global decline in the percentage of deaths caused by communicable diseases. For example, HIV/AIDS dropped from the 8th leading cause of death in 2000 to the 19th

in 2019, reflecting the success of efforts to prevent infection, test for the virus and treat the disease over the last two decades. While it remains the fourth leading cause of death in Africa, the number of deaths has dropped by more than half, falling from over 1 million in 2000 to 435,000 in 2019 in Africa.

Tuberculosis

Tuberculosis is also no longer in the global top ten, falling from 7th place in 2000 to 13th in 2019, with a 30% reduction in global deaths. Yet, it remains among the top ten causes of deaths in the African and South-East Asian regions, where it is the 8th and 5th leading cause respectively. Africa saw

an increase in tuberculosis mortality after 2000, though this has started to decline in the last few years.

The new estimates also emphasize the toll that communicable diseases still take in low-income countries: six of the top ten causes of death in low-income countries are still communicable diseases, including malaria (6th), tuberculosis (8th) and HIV/AIDS (9th). Meanwhile, in recent years, WHO reports highlight an overall concerning slow-down or plateauing of progress against infectious diseases like HIV, tuberculosis and malaria.

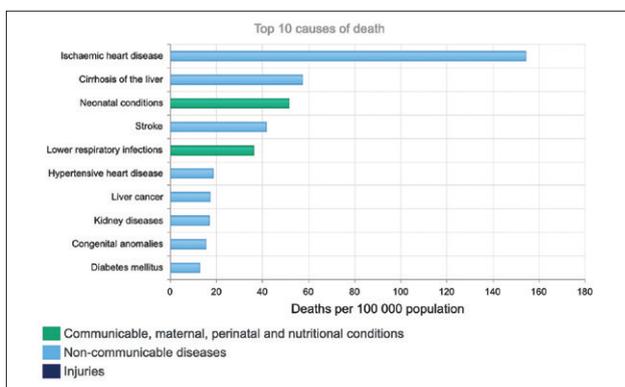
Longevity

The estimates further confirm the growing

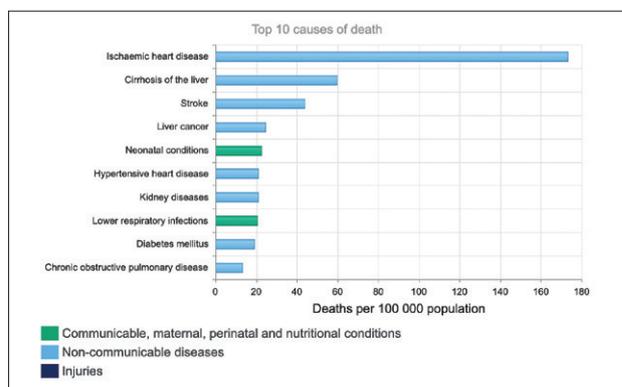
The leading causes of death in Middle East

The following graphs show the top 10 leading causes of death for all ages and both sexes in select countries in the Middle East for the years 2000 and 2019 to indicate the changes in the leading causes of mortality over the past two decades. Data supplied by the WHO Global Health Observatory.

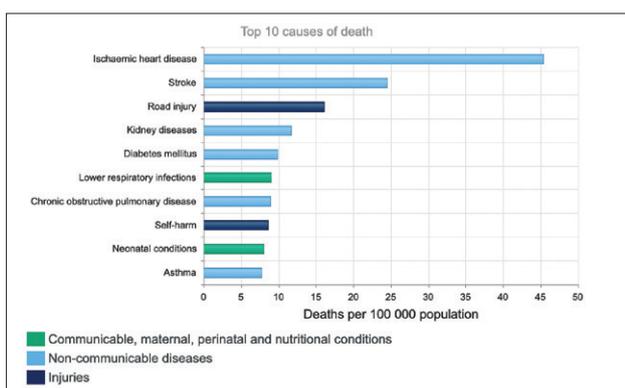
Egypt, 2000



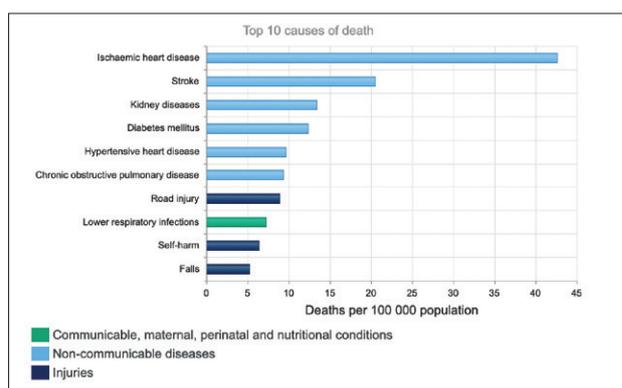
Egypt, 2019



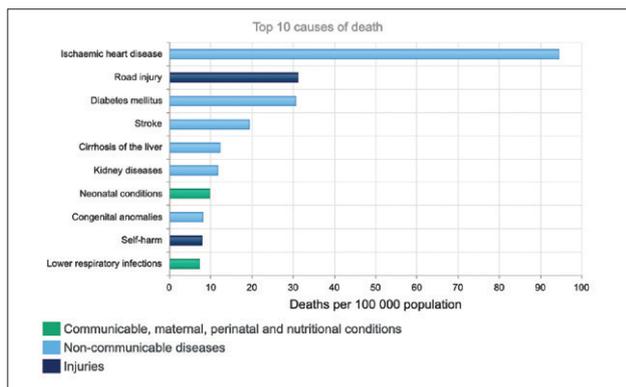
UAE, 2000



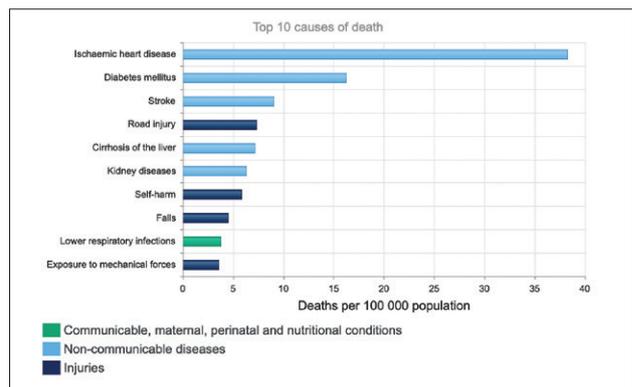
UAE, 2019



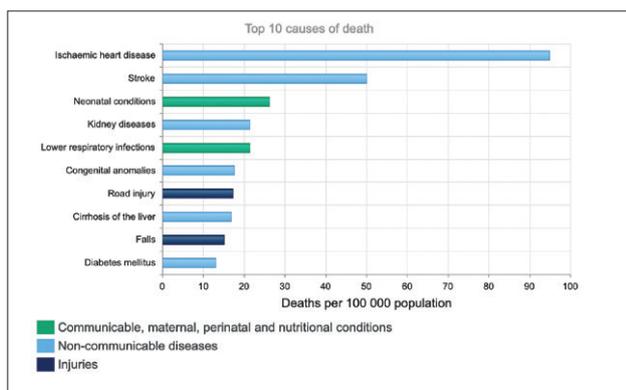
Qatar, 2000



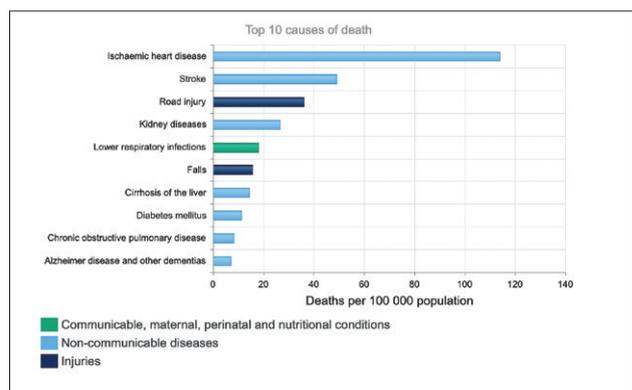
Qatar, 2019



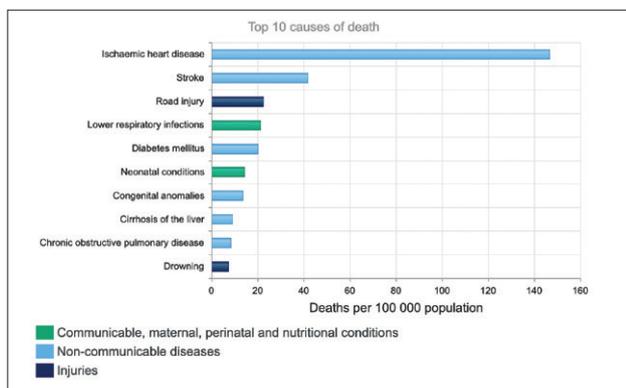
KSA, 2000



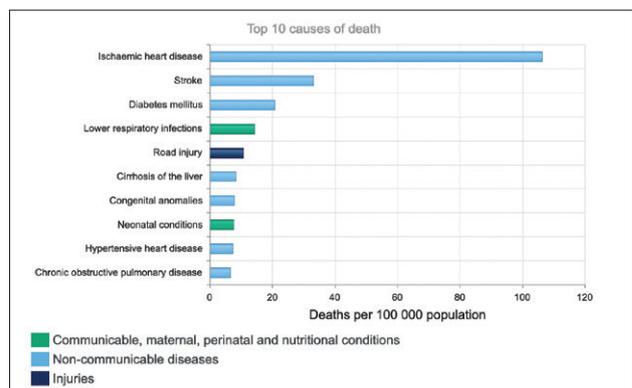
KSA, 2019



Oman, 2000



Oman, 2019



trend for longevity: in 2019, people were living more than six years longer than in 2000, with a global average of more than 73 years in 2019 compared to nearly 67 in 2000. But on average, only five of those additional years were lived in good health.

Disability

Disability is on the rise. To a large extent, the diseases and health conditions that are causing the most deaths are those that are responsible for the greatest number of healthy life-years lost. Heart disease, diabetes, stroke, lung cancer and chronic

obstructive pulmonary disease were collectively responsible for nearly 100 million additional healthy life-years lost in 2019 compared to 2000.

Injuries are another major cause of disability and death: there has been a significant rise in road traffic injuries in the African region since 2000, with an almost 50% increase in both death and healthy life-years lost. Similar but slightly smaller increases (at around 40%) were also observed for the Eastern Mediterranean region. Globally, deaths from road traffic injuries are 75% male.

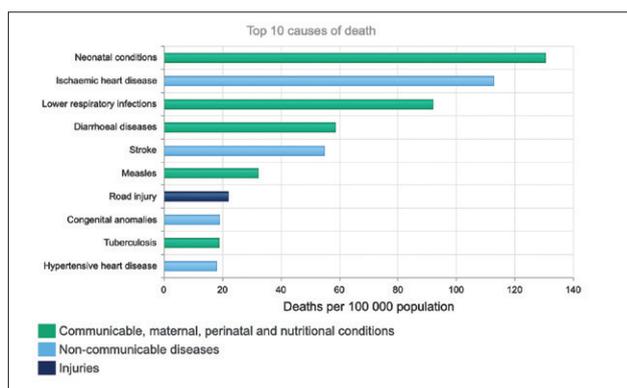
Drug use in the Americas

In the Americas, drug use has emerged as a significant contributor to both disability and death. There was a nearly threefold increase in deaths from drug use disorders in the Americas between 2000 and 2019. This region is also the only one for which drug use disorder is a top 10 contributor to healthy life-years lost due to premature deaths and disability, while in all other regions, drug use does not make the top 25.

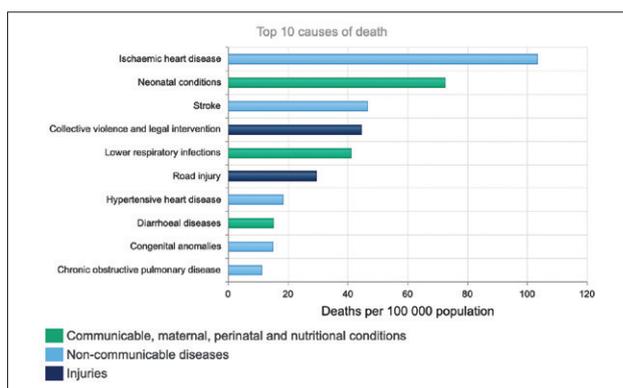
Data sources

WHO's Global Health Estimates

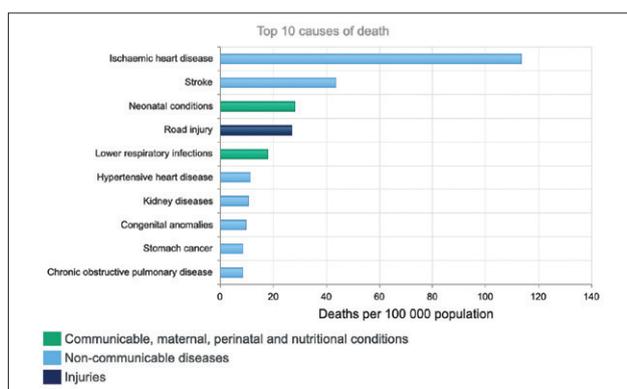
Yemen, 2000



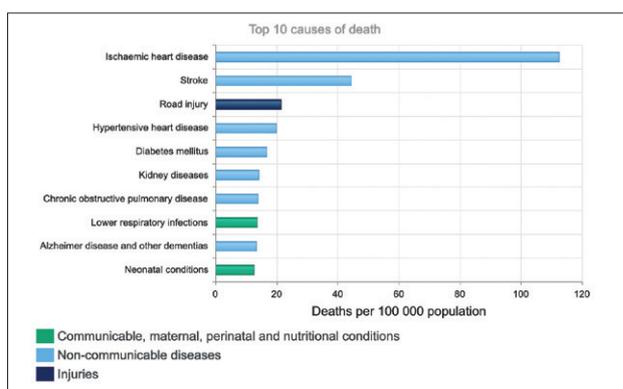
Yemen, 2019



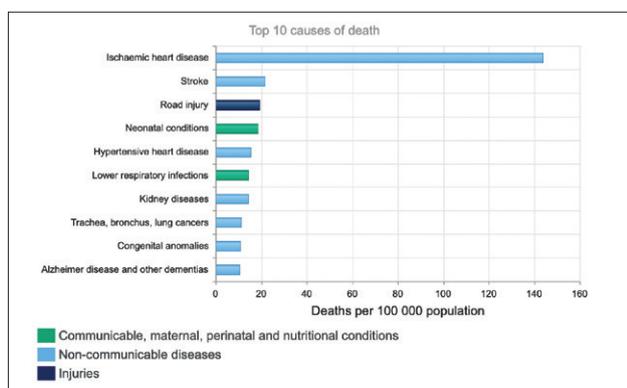
Iran, 2000



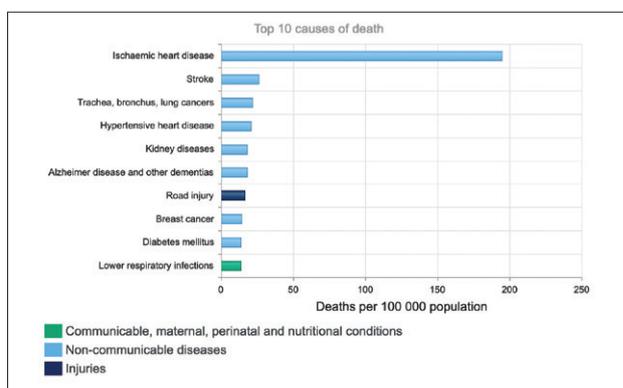
Iran, 2019



Lebanon, 2000



Lebanon, 2019



present comprehensive, comparable and transparent time-series data for population health, including life expectancy, healthy life expectancy, mortality and morbidity, and burden of disease at global, regional and country levels disaggregated by age, sex and cause, from 2000 onwards.

“These estimates are produced using data from the best available sources from countries and the international community,” said Dr Bochen Cao, the technical lead for WHO’s Global Health Estimates. “They are based on robust scientific methods for the processing, synthesis and analysis of data.

These updated estimates also benefited from the valuable contributions of WHO’s Member States through active country consultation and dialogue.”

The availability of services to prevent, diagnose and treat disease is key to reducing death and disability, influencing where different conditions are ranked. These new estimates clearly indicate where additional investments in services are most urgently needed.

Dr Samira Asma, Assistant Director-General for the Division of Data, Analytics and Delivery for Impact at WHO, added:

“Robust health data are critical to address inequalities, prioritize policies and allocate resources to prevent disability and save lives. The WHO Global Health Estimates are a powerful tool to maximize health and economic impact. We call upon governments and stakeholders to urgently invest in data and health information systems to support timely and effective decision-making.”



The Global Health Observatory
<https://www.who.int/data/gho>

Poor diet is top contributor to heart disease deaths globally

More than two-thirds of deaths from heart disease worldwide could be prevented with healthier diets. That's the finding of a study published 16 October 2020 in *European Heart Journal – Quality of Care and Clinical Outcomes*, a journal of the European Society of Cardiology (ESC).^[1]

The findings highlights the importance of affordable and sustainable healthy diets for all.

“Our analysis shows that unhealthy diets, high blood pressure, and high serum cholesterol are the top three contributors to deaths from heart attacks and angina – collectively called ischaemic heart disease,” said study author Dr. Xinyao Liu of Central South University, Changsha, China. “This was consistent in both developed and developing countries.”

“More than six million deaths could be avoided by reducing intake of processed foods, sugary beverages, trans and saturated fats, and added salt and sugar, while increasing intake of fish, fruits, vegetables, nuts and whole grains. Ideally, we should eat 200 to 300 mg of omega 3 fatty acids from seafood each day. On top of that, every day we should aim for 200 to 300 grams of fruit, 290 to 430 grams of vegetables, 16 to 25 grams of nuts, and 100 to 150 grams of whole grains,” she added.

The study analysed data provided by the Global Burden of Disease Study 2017, which was conducted in 195 countries between 1990 and 2017.^[2] In 2017, there were 126.5 million individuals living with ischaemic heart disease, and 10.6 million new diagnoses of the condition. Ischaemic heart disease caused 8.9 million deaths in 2017, which equates to 16% of all deaths, compared with 12.6% of all deaths in 1990.

Between 1990 and 2017, age-



standardised prevalence, incidence, and death rates per 100,000 people decreased by 11.8%, 27.4%, and 30%, respectively. But absolute numbers almost doubled. Dr Liu said: “While progress has been made in preventing heart disease and improving survival, particularly in developed countries, the numbers of people affected continues to rise because of population growth and ageing.”

The investigators calculated the impact of 11 risk factors on death from ischaemic heart disease. These were diet, high blood pressure, high serum low-density lipoprotein (LDL) cholesterol, high plasma glucose, tobacco use, high body mass index (BMI), air pollution, low physical activity, impaired kidney function, lead exposure, and alcohol use. Specifically, they estimated the proportion of deaths

that could be stopped by eliminating that risk factor.

Assuming all other risk factors remained unchanged, 69.2% of ischaemic heart disease deaths worldwide could be prevented if healthier diets were adopted. Meanwhile, 54.4% of these deaths could be avoided if systolic blood pressure was kept at 110–115 mmHg, while 41.9% of deaths could be stopped if serum LDL was kept at 0.7–1.3 mmol/L. About a quarter of deaths (25.5%) could be prevented if serum fasting plasma glucose was kept at 4.8–5.4 mmol/L, while eradicating smoking and second-hand smoke could stop one-fifth (20.6%) of deaths from ischaemic heart disease.

Notably, tobacco use ranked as fourth highest contributor to ischaemic heart

disease deaths in men but only seventh in women. Between 1990 and 2017, the global prevalence of smoking decreased by 28.4% in men and 34.4% in women. High BMI was the fifth highest contributor to ischaemic heart disease deaths in women and sixth in men. For women, 18.3% of deaths from ischaemic heart disease could be prevented if BMI was kept at 20–25 kg/m². In both sexes, the percentage contributions of air pollution and lead exposure to age-standardised ischaemic heart disease deaths increased as the country of residence became less developed.

Dr Liu said: “Ischaemic heart disease is largely preventable with healthy behaviours and individuals should take the initiative to improve their habits. In

addition, geographically tailored strategies are needed – for example, programmes to reduce salt intake may have the greatest benefit in regions where consumption is high (e.g. China or central Asia).”

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2. GBD 2017 Diet Collaborators. Health effects of dietary risks in 195 countries, 1990–2017: a systematic analysis for the Global Burden of Disease Study 2017. *Lancet*. 2019;393:1958–1972. [View](#)

Most type 2 diabetes patients are at high risk of a fatal heart attack or stroke

Preventing heart attacks and strokes in type 2 diabetes patients managed in primary care should be an urgent priority. That’s the conclusion of a study published in the *European Journal of Preventive Cardiology*, a journal of the European Society of Cardiology (ESC).^[1]

“The most striking result of our study was that the vast majority of patients (93%) had a high or very high risk of fatal events within a decade. Half of patients in the very high-risk group had no history of heart disease, meaning they would not be receiving medications to prevent heart attacks and strokes,” said study author Dr Manel Mata-Cases, a general practitioner for the Catalan Institute of Health in Sant Adrià de Besòs.^[2]

“As far as we know, this study in nearly 375,000 people from a well-validated population-based database illustrates the situation in the Mediterranean for the first time. Traditionally, cardiovascular risk in the region has been lower than in central and northern Europe or the US; therefore, our results should generate concern and a call for action to prevent heart attacks

and strokes in people with type 2 diabetes managed in primary care,” he added.

This was a cross-sectional study that used the Information System for the Development of Research in Primary Care (SIDIAP) database, which includes 74% of the total population in Catalonia, Spain. The SIDIAP database contains anonymous, longitudinal patient information extracted from the electronic medical record system (e-CAP) used by all primary health providers in Catalonia.

The study population consisted of 373,185 people aged 18 and over with a diagnosis of type 2 diabetes by 31 December 2016. The average age was 70.1 years and 45.2% were female. Some 72% had high blood pressure, 45% were obese, 60% had high serum cholesterol, and 14% were current smokers.

The investigators calculated the likelihood of each participant having a fatal heart attack or stroke within 10 years using categories in the ESC guidelines on diabetes and cardiovascular disease.^[3] The three categories are: very high risk (above 10%), high risk (between 5% and 10%),

and moderate risk (below 5%).

To be classified as very high risk, patients must have established cardiovascular disease (e.g. prior heart attack or stroke), or other conditions which threaten their health such as kidney impairment, or at least three cardiovascular risk factors (older age, high blood pressure, high serum cholesterol, smoking, obesity).^[4]

Over half of the participants (53.4%) were at very high risk of fatal events. This observation was more frequent in men (55.6%) than in women (50.7%). Some 39.6% were classified as high risk and just 7% had moderate risk of dying from a heart attack or stroke within 10 years.

Dr Mata-Cases concluded: “These findings in a primary care setting should fuel the implementation of integrated care. Healthy behaviours are the cornerstone of preventing cardiovascular disease and need to be combined with control of blood glucose, serum cholesterol, and blood pressure. GPs and nurses should agree treatment objectives with patients considering their characteristics and preferences.”

References:

1. Cebrián-Cuenca AM, Mata-Cases M, Franch-Nadal J, et al. Half of patients with type 2 diabetes mellitus are at very high cardiovascular risk according to the ESC/EASD: data from a large Mediterranean population. *Eur J Prev Cardiol.* 2020. doi:10.1093/eurjpc/zwaa073.

2. Dr. Mata-Cases is also a researcher at the Barcelona Ciutat Research Support Unit of the

Foundation University Institute for Primary Health Care Research Jordi Gol i Gurina (IDIAPJGol) and the Centre of Investigation of Diabetes and Associated Metabolic Diseases (CIBERDEM) in Barcelona.

3. Cosentino F, Grant PJ, Aboyans V, et al. 2019 ESC Guidelines on diabetes, pre-diabetes, and cardiovascular diseases developed in collaboration with the EASD. *Eur Heart J.* 2020;41:255–323.

4. The high risk category includes patients with established cardiovascular disease (e.g. prior heart attack or stroke). It also includes those with three or more cardiovascular risk factors (older age, high blood pressure, high blood cholesterol, smoking, obesity) or organ damage (proteinuria, kidney impairment, enlargement/thickening of the heart’s left ventricle, retinopathy). 

Predicting heart disease from the skin

Our skin tells us when we’ve spent too much time in the sun or when the dry air of winter has sucked away too much moisture. Now Jefferson researchers find that the skin can also foretell issues unrelated to the protective barrier.

An international team of researchers led by Jouni Uitto, MD, PhD, a Professor of Dermatology and Cutaneous Biology, report that mutations in a gene known to underlie a rare skin disorder also lead to a serious heart disease. The findings are the latest example from Dr Uitto’s laboratory to show that when combined with genetic analysis, the skin may help to predict future medical conditions.

“By looking into the skin of newborns, we can predict the development of a devastating heart disease later in life,” Dr Uitto says. “This is predictive personalized medicine at its best.”

The researchers published the findings 10 December 2020 in the journal *Scientific Reports*.

A renowned skin disease expert, Dr Uitto has been on a global hunt for mutations in families with genetic skin disorders for three decades. Over the last five years, he and his team have analysed mutations in about 1800 families around the world, searching for the genetic culprits behind skin conditions such as epidermolysis bullosa (EB). EB is a severe disease that makes the skin extraordinarily fragile. Patients with EB can develop blisters and poorly healing wounds from the lightest touch.

The researchers scrutinized the DNA

of more than 360 EB patients from around the world. In particular, they analyzed DNA isolated from blood samples for sequence variants in a set of 21 genes known to harbor mutations that cause EB. The analysis revealed that two patients had the exact same mutation in a gene known as JUP.

The patients had shown the same symptoms in early infancy, including very fragile skin, thickened skin on the palms of the hands and soles of the feet, and hair loss that extended to the eyebrows and eyelashes. But now one patient was a 2.5-year-old boy who only showed skin anomalies, while the other was a 22-year-old woman who also had a heart condition called arrhythmogenic right ventricular cardiomyopathy (ARVC).

“This is a serious disease that can require a heart transplant if the damage is too severe because of heart failure and life threatening fast heart rhythms,” says Reginald Ho, MD, a cardiologist in the department of medicine at Sidney Kimmel Medical College, who co-authored the study.

In ARVC, rigid, fibrous tissue displaces healthy heart muscle over time. As a result, the heart develops abnormal rhythms and becomes weak. ARVC patients are vulnerable to heart failure and sudden cardiac death. Indeed, ARVC is responsible for as much as 20 percent of sudden cardiac deaths in those under 30. Many require an implantable defibrillator to manage life-threatening arrhythmias. Mutations in *JUP* that cause EB can also

lead to stiffness of the heart muscle, and ARVC.

Although the young boy did not yet have heart problems, the genetic findings suggest that he will develop them down the road.

“This means that with mutation analysis, you can predict when looking at EB patients at birth, whether they will have this very severe heart condition later in life,” Dr Uitto says.

“These patients need to be monitored carefully for heart problems,” he adds.

The findings add to a string of discoveries Dr Uitto and colleagues have unveiled in recent years in their search for the genes that underlie severe skin conditions. In 2019, for example, the researchers found that patients with a skin condition known as ichthyosis can develop liver problems later in life that are severe enough to require a transplant.

“We are looking to identify new genes behind skin diseases like EB and ichthyosis,” Dr Uitto says. “By looking at patients’ symptoms and family history, we have uncovered something completely unexpected.”

“Together, these studies show how the skin can help predict severe medical problems,” Dr Uitto says.

Reference:

Arrhythmogenic Right Ventricular Cardiomyopathy in Patients with Biallelic JUP-associated Skin Fragility, *Scientific Reports.* <https://doi.org/10.1038/s41598-020-78344-9> 

Risk of heart complications after major surgery higher than previously thought

One in five high-risk patients undergoing major non-cardiac surgery will develop one or more heart complications within a year, according to research published in *European Heart Journal – Acute Cardiovascular Care*, a journal of the European Society of Cardiology (ESC).^[1]

“Our study reveals a greater likelihood of having heart problems or dying after non-cardiac surgery than has been recognised to date,” said study author Dr. Christian Puelacher of the University of Basel, Switzerland. “Patients are also at risk for a longer period than was previously thought.”

The study was conducted in high-risk patients, which included people aged 65 to 85, and those aged 45 to 64 with cardiovascular disease (coronary artery disease, peripheral artery disease, or prior stroke). All patients had non-cardiac surgery which required them to stay in hospital at least one night afterwards. The types of procedures included visceral, orthopaedic, trauma, vascular, urologic, spinal, and thoracic surgery.

“People who undergo major surgery are increasingly old and have other diseases, and these are the patients we focused on in our study,” said Dr Puelacher. “By providing information on postoperative complications, our research provides opportunities to make surgery even safer.”

More than 300 million surgeries are performed worldwide each year.^[2] Despite the advantages, surgery can trigger cardiac events including heart attacks, heart failure, heart rhythm disturbances, and death. Previous research has shown that nearly three-quarters of patients who die after surgery were never admitted to critical care,^[3] suggesting that their risk was unrecognised. In addition, some complications go undetected because there are no symptoms – for example, patients who have a heart attack soon after surgery may not have chest pain because of pain medications. These asymptomatic heart attacks put the patient at the same risk of

dying as those with symptoms.^[4]

The study included 2,265 patients. The average age was 73 years and 43% were women. Patients were followed for one year after surgery for heart attacks, heart failure, heart rhythm disorders, and death due to cardiovascular disease. To detect asymptomatic heart attacks, all patients had serial measurements of troponin while in hospital – this protein is elevated in the blood when the heart muscle is injured.

Approximately one in seven patients (15%) had at least one heart complication within 30 days. The 30-day incidence of heart complications was highest in patients who had thoracic surgery (22%), followed by vascular surgery (21%) and trauma surgery (19%). One in five patients (21%) had at least one heart complication within one year.

“This was one of the first studies to monitor patients for asymptomatic heart attacks after surgery,” said Dr Puelacher. “These patients were at greater risk of subsequent events. One-third of patients who had an asymptomatic heart attack went on to have at least one more heart complication, compared to just 10% of those who did not have an asymptomatic heart attack. Our study suggests that measuring troponin levels before surgery and for two days afterwards could identify these patients and provide an opportunity to prevent further complications and death.”

Most complications occurred within the first 30 days after surgery, and in particular within the first week. But the investigators identified a vulnerable period of up to five months. Dr Puelacher said: “Our results indicate that this high-risk patient group has an elevated likelihood of having an adverse cardiac event for three to five months after major surgery.”

Dr Puelacher noted that the study did not investigate what patients can do to improve their outcomes. But he said: “Surgery is a process rather than a quick fix. Do not postpone your surgery, but

Our study suggests that measuring troponin levels before surgery and for two days afterwards could identify these patients and provide an opportunity to prevent further complications and death.

if there is time and you want to prepare, quit smoking, be physically active and eat healthily so your body is in better shape.”

Full bibliographic information

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2. Weiser TG, Haynes AB, Molina G, et al. Estimate of the global volume of surgery in 2012: an assessment supporting improved health outcomes. *Lancet*. 2015;385:S11.
3. Pearse R, Moreno RP, Bauer P, et al. Mortality after surgery in Europe: a 7 day cohort study. *Lancet*. 2012;380:1059–1065.
4. Puelacher C, Lurati Buse G, Seeberger D, et al. Perioperative myocardial injury after noncardiac surgery. *Circulation*. 2018;137:1221–1232. [MEH](#)

Improving outcomes in cardiology

Cardiovascular disease (CVD) is one of the single largest killers worldwide.

The Middle East is no exception; in fact the onset of CVD occurs on average ten years earlier in the United Arab Emirates (UAE) compared to the rest of the world, while one in four adults in Saudi Arabia are likely to have a heart attack within the next 10 years.

This means a concerted, immediate and ongoing effort – across the care continuum – from healthy living and prevention to diagnosis, treatment and home care is a non-negotiable. To drive down the incidences and increase positive outcomes of CVD, the healthcare and consumer worlds must come together, and information must flow freely between the two

PREVENTION: Supporting healthy lifestyles

An end-to-end cardiac care ecosystem that delivers better outcomes at a lower cost, begins with consumer power, enabled by healthy living and prevention applications

“This shift puts people at the heart of a system that preserves health first – prioritising healthcare over sick care,” says Vincenzo Ventricelli, Chief Executive Officer for Middle East, Turkey & Africa at Philips.

A second important touchpoint in CVD prevention is healthcare practitioner access to more lifestyle data in order to identify health risks early on.

DIAGNOSE: Benefiting from connected and integrated technology

As CVD progress in a patient, the data mounds, which creates two common challenges – data fatigue due to an overwhelming amount of information, or data gaps due to non-interoperability across facilities or systems.

To simplify the complex care environment, the Philips IntelliSpace



Cardiovascular platform can help physicians access and process all that information in meaningful ways, by holding all relevant patient data from throughout the hospital and beyond on one accessible platform.

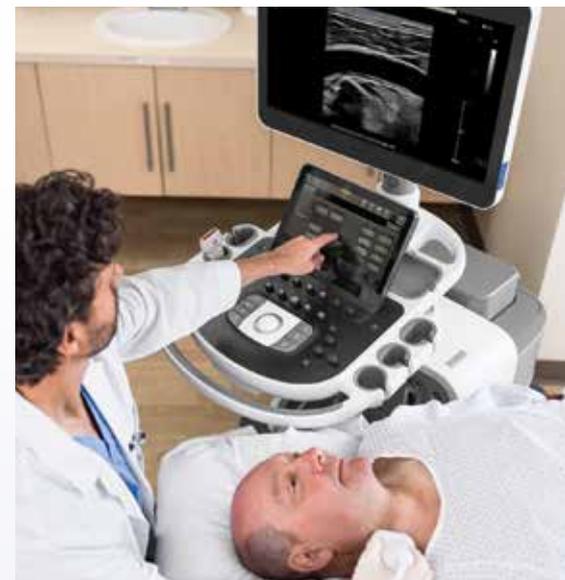
In line with Philips' commitment to interoperability, IntelliSpace Cardiovascular also interfaces with multiple third-party applications, including scheduling systems, lab applications, and specialty picture archiving and communication systems (PACS). This comprehensive insight helps reduce the time and frustration related to accessing multiple systems and allows clinicians to search for specific information – like previous test results – across systems in a single workspace.

“By aggregating all of this data, clinicians are able to make more informed decisions and better collaborate with peers, to deliver high levels of patient care, efficiently and effectively,” says Ventricelli.

In addition to detailed historic data, an accurate view of structural heart abnormalities, or impacted blood flows, via Philips EPIQ CVx cardiovascular ultrasound system assists healthcare practitioners from initial diagnosis to treatment

TREATMENT: Improved workflow in cath labs

By empowering clinicians to move quickly and confidently through procedures, limited resources could reach more patients. To realize this need, the Philips Azurion, a next generation image guided therapy platform, can be used to diagnose and treat patients in hospitals or specialist clinics,



providing image guidance in diagnostic, interventional and minimally invasive surgery across cardiovascular procedures. Hospitals using Azurion have seen a 12% reduction in patient preparation time and 17% reduction in procedure time which frees up capacity to treat one more patient a day, now or in the future

These connected and integrated solutions across the continuum aim to save and improve lives, while reducing the total cost of care by making therapy more efficient, more appropriate and more personal, which ultimately delivers better healthcare.

“I am convinced that taking a holistic approach to cardiac care will bring real change in how we continue to manage and prevent heart disease moving forward,” says Ventricelli. 



Zaid Al-Kadhimi, MD, Director of Bone Marrow Transplant and Cellular Therapy, Associate Professor, Internal Medicine, Division of Oncology & Hematology

Blood and Marrow Transplant Program one of the best in the United States

The Nebraska Medicine Blood and Marrow Transplant (BMT) Program at the Fred & Pamela Buffett Cancer Center is one of the top programs of its kind in the United States. Our team of 12 hematologists includes national and international experts in lymphoma, leukemia, MDS, myelofibrosis and multiple myeloma.

These physicians specialize in BMT and CAR T-cell therapy research. Since the 1980s, the program has pioneered several methods of stem cell mobilization, which eventually became national standards. We perform about 180 transplants per year and more than 5,000 patients have been treated from all 50 states and various countries around the world.

The scientific mission for the program is to develop transplant platforms with minimal physical and immunologic toxicity and a focus on enhancing anti-

tumor immune response post-transplant. One of the differentiators of the Fred & Pamela Buffett Cancer Center is the integration of scientists and clinicians, which provides them with the opportunity to work together in the evaluation of our cancer patients to design new treatments. Doctors and researchers work in the same building. As an NCI-designated cancer center, we perform many clinical trials for patients with hematologic malignancies pre- and post-transplant, which provides us access to cutting edge therapy options for our patients.

To provide each person who needs a transplant with the best care possible, our highly skilled transplant doctors, nurses, nurse practitioners and pharmacists work collaboratively with a team of experts that includes radiation oncologists, immunologists, gastroenterologists, kidney

specialists, radiologists, psychiatrists, psychologists, physical and occupational therapists and social workers.

An example of medical advancement made possible by our kidney and bone marrow transplant teams is their collaboration on a phase 3 clinical trial to overcome kidney rejection by transplanting a living kidney donor's stem cells into the recipient shortly after the kidney is transplanted.

- For more information, please contact the office of International Healthcare Services at Nebraska Medicine: oihs@nebraskamed.com 

Nebraska Medicine is one of the first to offer the newly FDA-approved Chimeric Antigen Receptor (CAR T-cell) therapy.



"This type of treatment can't be done at just any hospital or center in the United States. It's limited with respect to what's needed to process the cells and the specialized patient care," explains Julie Vose, MD, hematologist and medical oncologist at Nebraska Medicine

and chief of hematology/oncology at the University of Nebraska Medical Center (UNMC).

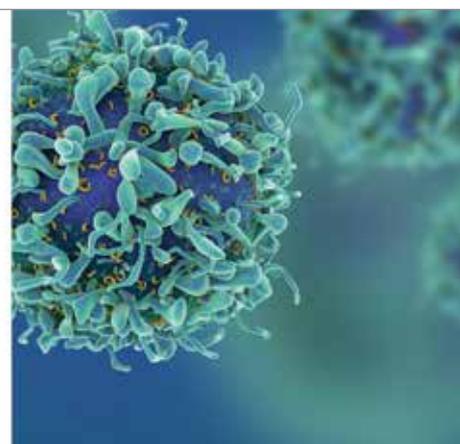


Contact the International Healthcare Services

Website: NebraskaMed.com/International

Phone: +1 402.559.3090

Email: oihs@nebraskamed.com



Refer a patient for CAR T-cell

The CAR T-cell therapy is open to adult patients (19 years and older) with relapsed b-cell lymphomas, which is a subtype of non-Hodgkin lymphoma.

With deep learning algorithms, standard CT technology produces spectral images

Rensselaer, First-Imaging, and GE Global researchers develop a deep neural network to perform nearly as well as more complex dual-energy CT imaging technology

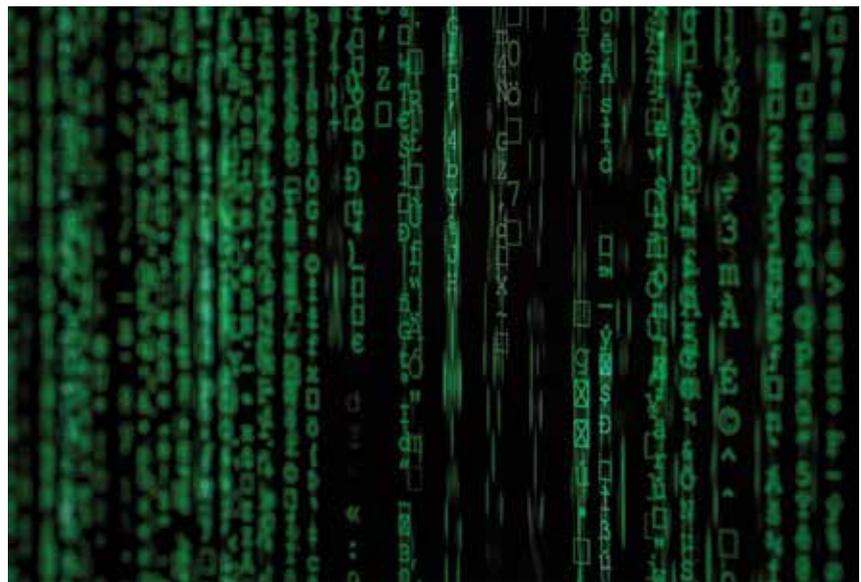
Bioimaging technologies are the eyes that allow doctors to see inside the body in order to diagnose, treat, and monitor disease. Ge Wang, an endowed professor of biomedical engineering at Rensselaer Polytechnic Institute, has received significant recognition for devoting his research to coupling those imaging technologies with artificial intelligence in order to improve physicians' "vision".

In research published in *Patterns* <[https://www.cell.com/patterns/fulltext/S2666-3899\(20\)30169-0](https://www.cell.com/patterns/fulltext/S2666-3899(20)30169-0)>, a team of engineers led by Wang demonstrated how a deep learning algorithm can be applied to a conventional computerized tomography (CT) scan in order to produce images that would typically require a higher level of imaging technology known as dual-energy CT.

Wenxiang Cong, a research scientist at Rensselaer, is first author on this paper. Wang and Cong were also joined by co-authors from Shanghai First-Imaging Tech, and researchers from GE Research.

"We hope that this technique will help extract more information from a regular single-spectrum X-ray CT scan, make it more quantitative, and improve diagnosis," said Wang, who is also the director of the Biomedical Imaging Center within the Center for Biotechnology and Interdisciplinary Studies (CBIS) at Rensselaer.

Conventional CT scans produce images that show the shape of tissues within the



body, but they don't give doctors sufficient information about the composition of those tissues. Even with iodine and other contrast agents, which are used to help doctors differentiate between soft tissue and vasculature, it's hard to distinguish between subtle structures.

A higher-level technology called dual-energy CT gathers two datasets in order to produce images that reveal both tissue shape and information about tissue composition. However, this imaging approach often requires a higher dose of radiation and is more expensive due to needed additional hardware.

"With traditional CT, you take a grayscale image, but with dual-energy CT you take an image with two colours," Wang said. "With deep learning, we try to use the standard machine to do the job of dual-energy CT imaging."

In this research, Wang and his team demonstrated how their neural network was able to produce those more complex images using single-spectrum CT data. The researchers used images produced by dual-energy CT to train their model and found that it was able to produce high-quality approximations with a relative error of less than 2%. IMEH

Cardiac CT can double as osteoporosis test

Cardiac CT exams performed to assess heart health also provide an effective way to screen for osteoporosis, potentially speeding treatment to the previously undiagnosed, according to a study published in *Radiology*.

Osteoporosis is a disease that causes the bones to weaken and become vulnerable to fracture. It affects an estimated 200 million people worldwide. Early detection and treatment are important, as several classes of drugs are effective at reducing the risk of fractures that exact a devastating toll on victims.

Bone mineral density (BMD) tests can diagnose osteoporosis, but the number of people who get these tests is suboptimal.

“Osteoporosis is a prevalent, underdiagnosed and treatable disease associated with increased morbidity and mortality,” said study lead author Josephine Therkildsen, M.D., from Herning Hospital, Hospital Unit West, in Herning, Denmark. “Effective anti-osteoporotic treatment exists and so, identifying individuals with greater fracture rate who may benefit from such treatment is imperative.”

Dr Therkildsen and colleagues recently looked at cardiac CT, a test done to assess heart health, as an opportunistic way to screen for osteoporosis. Because the cardiac CT scan also visualizes the thoracic vertebrae, the bones that form the vertebral spine in the upper trunk, it is relatively easy to add a BMD test to the procedure.

The study involved 1,487 participants who underwent cardiac CT for evaluation of heart disease. Participants also had BMD testing of three thoracic vertebrae using quantitative CT software.

Of the 1,487 people in the study, 179, or 12%, had very low BMD. During follow-up of just over three years on average, 80 of the participants, or 5.3%, were diagnosed with a fracture. The fracture was osteoporosis-related in 31 of the 80 people.

The association between a very low BMD and a higher rate of fracture strongly suggests that thoracic spine BMD may be used to guide osteoporosis preventive measures and treatment decisions, the study authors said.

Adding BMD testing to cardiac CT is feasible and applicable in a clinical setting, according to Dr Therkildsen. It does not add time to the exam and doesn't expose the patient to any additional radiation. In fact, Dr Therkildsen said, technological advances over time have reduced the radiation dose given at cardiac CT. BMD measurements can be made using existing non-enhanced CT images as long as a suitable calibration system is ensured, scanner stability is continuously monitored and systematic imaging acquisition techniques are implemented.

“We believe that opportunistic BMD testing using routine CT scans can be done with little change to normal clinical practice and with the benefit of identifying individuals with a greater fracture rate,” Dr Therkildsen said.

Although the researchers used cardiac CT images in the study, in theory any CT images that include a view of relevant bone structures could be used for measur-

We believe that opportunistic BMD testing using routine CT scans can be done with little change to normal clinical practice and with the benefit of identifying individuals with a greater fracture rate.

ing BMD. The development of fully automated software for BMD measurements further enhances the adaptability and convenience of this approach.

Additional research will help pin down the optimal BMD cut-off values for treatment while providing more data on fracture risk based on gender and areas of the body. The impact of clinical risk factors in combination with BMD measured from CT scans for the assessment of fracture risk would also benefit further study.

“Our research group is dedicated to extend the research in this field, as we believe it should be added to clinical practice,” Dr Therkildsen said.

Reference:

“Thoracic Bone Mineral Density Derived from Cardiac CT Is Associated with Greater Fracture Rate.” *Radiology*. <https://doi.org/10.1148/radiol.2020192706> 

Automated CT biomarkers predict cardiovascular events better than current practice

Researchers at the US National Institutes of Health and the University of Wisconsin have demonstrated that using artificial intelligence to analyse CT scans can produce more accurate risk assessment for major cardiovascular events than current, standard methods such as the Framingham risk score (FRS) and body-mass index (BMI).

More than 80 million body CT scans are performed every year in the U.S. alone, but valuable prognostic information on body composition is typically overlooked. In this study, for example, abdominal scans

done for routine colorectal cancer screening revealed important information about heart-related risks - when AI was used to analyse the images.

The study compared the ability of automated CT-based body composition biomarkers derived from image-processing algorithms to predict major cardiovascular events and overall survival against routinely used clinical parameters. The investigators found that the CT-based measures were more accurate than FRS and BMI in predicting downstream adverse events

including death or myocardial infarction, cerebrovascular accident, or congestive heart failure. The results appeared in *The Lancet Digital Health*.

“We found that automated measures provided more accurate risk assessments than established clinical biomarkers,” said Ronald M. Summers, M.D., Ph.D., of the NIH Clinical Center and senior author of the study. “This demonstrates the potential of an approach that uses AI to tap into the biometric data embedded in all such scans performed for a wide range of other

indications and derive information that can help people better understand their overall health and risks of serious adverse events.”

The study used five AI computer programs on abdominal CT scans to accurately measure liver volume and fatty change, visceral fat volume, skeletal muscle volume, spine bone mineral density, and artery narrowing. Researchers found that not only did the combination of automated CT-based biomarkers compare favourably with the FRS and BMI for predicting cardiovascular events and death before any symptoms were present but in fact, the CT measure of aortic calcification, that is build-up of calcium deposits in the aortic valve, alone significantly outperformed the FRS for major cardiovascular events and overall survival.

The researchers also observed that BMI was a poor predictor of cardiovascular events and overall survival, and all five automated CT-based measures clearly outperformed BMI for adverse event prediction.

“This opportunistic use of additional CT-based biomarkers provides objective value to what doctors are already doing,” said Perry J. Pickhardt, M.D., of the University of Wisconsin School of Medicine & Public Health, lead and corresponding author of the study. “This automated process requires no additional time, effort, or radiation exposure to patients, yet these prognostic measures could one day impact patient health through presymptomatic detection of elevated cardiovascular or other health risks.”

This research builds on prior efforts de-

signing AI algorithms that Dr Summers has undertaken in his lab in the NIH Clinical Center’s Radiology and Imaging Sciences Department and his previous collaboration with Dr Pickhardt to develop, train, test, and validate fully automated algorithms for measuring body composition using abdominal CT. The researchers plan to test the approach in other studies, including more racially diverse populations.

Reference:

Automated CT biomarkers for opportunistic prediction of future cardiovascular events and mortality in an asymptomatic screening population: a retrospective cohort study. *The Lancet Digital Health*. [https://doi.org/10.1016/S2589-7500\(20\)30025-X](https://doi.org/10.1016/S2589-7500(20)30025-X) 

Next-gen micro-CT scan can lower radiation, offer better pictures

With a five-year, \$3.2 million grant from the US National Institute of Biomedical Imaging and Bioengineering, Mini Das, associate professor of physics at the University of Houston, will help usher in the next generation of micro computed tomography (CT) imaging. The project’s goal is to lower radiation dose in X-ray micro-CT imaging while improving the resolution and enhancing the contrast of three-dimensional pictures of small specimens, like tumours or biomaterials.

“This has the potential to transform the landscape of micro-CT imaging,” said Das, who recently developed the theory, instrumentation and algorithms for spectral phase-contrast imaging (PCI) to enable the use of much lower doses of radiation while delivering higher levels of image detail.

Das’s work addresses the challenge of current in-vivo micro-CT scanning – long imaging times, harmful, yet required, high radiation dose levels needed to follow the same subject over time, and poor image contrast.

“Current X-ray and CT systems have

inherent contrast limitations and dense tissue and cancer can often look similar. Even if you increase the radiation dose, there is a limit to what you can see. In addition, image noise becomes significant when increasing resolution to see fine details, often desirable when scanning small objects,” said Das.

PCI detects how X-rays bend, or refract, particularly at the interface between tissues, providing a higher amount of contrast between different types of tissue. It also measures absorption and phase changes from X-ray transmission through the body. The resulting phase-enhanced contrast depicts high fine-structure visibility adding new image features. The developed methods can also translate to large scale CT systems.

Detecting the bending of X-rays is challenging because the bend is small and they are both bending and being absorbed in tissues at the same time, complicating interpretation.

“X-rays, like visible light, exhibit what is called dual nature – they behave both as particles, called photons or packets of light, and waves. Phase imaging methods capture information relevant to wave nature of X-rays unlike conventional imag-



University of Houston

University of Houston associate professor of physics Mini Das developed the theory, instrumentation and algorithms for spectral phase-contrast imaging (PCI) to enable the use of much lower doses of radiation while delivering higher levels of image detail in micro-CT scanning.

ing systems found in clinics today,” said Das.

Das is using a new multi-energy, or spectral, detector which can see the energy of every light particle and will develop a unique spectral micro-CT system with both PCI and non-PCI capabilities.

“We are the first to show how to use photon-counting detectors in a phase-contrast imaging setting while extracting the absorption and phase effects with quantitative accuracy. This accurate phase retrieval, or recovery, is so important if you want to discriminate between cancers and normal tissues,” she said. 



Philips iQon Spectral CT – the first scan is the right scan

Conventional CT scans often produce ambiguous or inaccurate data that can require additional testing. As the world's first spectral detector-based CT, the Philips iQon Spectral CT delivers multiple layers of retrospective data in a single, low-dose scan, empowering you to improve clinical confidence. The Philips iQon Spectral CT extends the benefits of spectral data to all patients, providing answers for even the most challenging scenarios. Now, every technician can acquire spectral data with every scan – data that can be viewed by care teams across your organization helping determine the best path for patient care.

Despite improvements in technology, making scans more efficient, for many patients, going to a hospital is still a stressful experience. Stress affects a patient's ability to comply with staff requests and reducing that stress is key to making it easier for them to cooperate, thereby decreasing delays and retakes. Philips Ambient Experience solutions use dynamic lighting, projection and sound to give patients greater control and positive distractions during their journey. Patients become an active participant in the process and can personalize the imaging environment by selecting a journey, and



concentrating on various elements of the selected theme, rather than the imposing equipment. This together with the “first scan is always the right scan” capabilities of Philips iQon can lead to a much improved patient experience.

- For more information, visit: <https://www.philips.ae/healthcare/resources/landing/iqon-spectral-ct>
<https://www.philips.ae/healthcare/consulting/experience-solutions/ambient-experience/radiology#radiology>



Study explores how telemedicine can ease ER overcrowding

Overcrowding in emergency rooms is a costly and concerning global problem, compromising patient care quality and experience. In a new study, a researcher from The University of Texas at Dallas investigated whether telemedicine could enhance ER care delivery.

“This longstanding problem is mainly driven by the imbalance between increasing patient flow and the shortage of emergency room capacity,” said Dr Shujing Sun, assistant professor of information systems in the Naveen Jindal School of Management and lead author of the study.

“While the ER is supposed to be a safety net of the health care system, the overcrowding problem has strained this safety net and posits various threats,” Sun said. “For example, long waiting times and treatment delays cause adverse patient outcomes, such as high readmission and mortality rates. They also increase financial costs, reduce patients’ satisfaction and impair physician efficiency.”

In the study, published in the September issue of *Information Systems Research*, Sun and her colleagues investigated the potential of telemedicine as a generic solution to reduce ER congestion.

Sun said telemedicine, defined as the remote delivery of health care services and clinical information using telecommunications technology, has been gradually adopted in recent years, but there is little evidence on the impact of its applications within the ER setting.

“Telemedicine application in the ER has two distinguishing features from home-based telemedicine,” Sun said. “First, patients present in the ER. Second, on-site assistance is available to connect patients and off-site physicians throughout the telemedicine service. Off-site physicians can be within the same hospital, in a different hospital, or even at home, as long as they can connect with emergency patients through videoconferencing tools and have access to patients’ health records.”



According to the National Hospital Ambulatory Medical Care Survey, from 2000 to 2015, the number of ER visits in the U.S. increased 27% from 108 million to nearly 137 million. With the sharp rise in ER visits and critical shortages of emergency care physicians, ER overcrowding is not abating, particularly as the Covid-19 pandemic strains the capacity of hospitals nationwide.

Benefits of telemedicine

Using a large data set covering all emergency visits in New York state from 2010 to 2014, the researchers found that the adoption of telemedicine in the ER significantly shortened average length of stay and wait time.

ER telemedicine improves an on-call physician’s efficiency through transportation elimination and smoother workflow, which can shorten a patient’s wait for physicians.

For example, when there is an influx of emergency patients, telemedicine enables on-site nurse practitioners or physician assistants to treat patients with minor conditions under the remote supervision of off-site physicians. Sun said this is important because many hospitals require that all

patients be seen by an attending physician. With telemedicine, on-call physicians can work from their office without travelling to the ER. Having an on-call physician available through telemedicine also can speed up the ordering of lab work, so that those processes can start long before they otherwise would, and physicians can pivot to their administrative tasks more quickly in between visits.

The researchers replicated the analysis using annual U.S. hospital data and found that ER telemedicine adoption significantly reduces average wait times documented in Medicare.gov’s Hospital Compare, or the average time a patient spends in the ER before being seen by a health care professional. That finding suggests that the reduction in length of stay – the total time from the first documented time after arrival at the ER to the time the patient is discharged from the ER – partially comes from the reduction of waiting time.

Flexible resource allocation

Telemedicine could achieve greater efficiencies through several channels, Sun said. In addition to more efficient information exchange, the study showed

Although the ER seems to be an unlikely place for telemedicine to play its role, it is happening, and in fact, is very promising.

telemedicine can significantly improve ER care delivery through flexible resource allocation, especially when there is a shortage of on-site physician staffing or a hospital lacks certain expertise.

For example, whether to administer tissue plasminogen activator after stroke symptoms is a time-sensitive and complicated medical decision. However, some hospitals lack such expertise. Through a telestroke programme, a type of ER telemedicine application, on-site emergency physicians can immediately consult remote stroke specialists to perform real-time diagnoses and recommend treatment plans in a timely manner.

“Although the ER seems to be an unlikely place for telemedicine to play its role, it is happening, and in fact, is very promising,” Sun said. “We believe our findings are critical for ERs, considering the unique setting of unscheduled arrivals and unpredictability of patient traffic.”

It’s important to note that the improvement in care delivery does not come at the expense of care quality or patient cost, Sun said.

The study provides health care decision-makers with a careful examination of the causal implications of ER telemedicine on care delivery efficiency, care quality and medical expenditure.

“Due to the lack of evidence and the inflexibility of reimbursement policy, the adoption rate of telemedicine in the ER remains low and is growing only slowly,” Sun said. “Policymakers can incentivize adoption of ER telemedicine by reducing regulatory barriers, such as lifting restrictions regarding cross-state practitioners’ licensure and providing better reimbursement coverage.”

With the current global Covid-19 pandemic and the expanded use of telemedicine applications in recent months, Sun said telemedicine has shown its promise to protect patients and providers without compromising healthcare access.

“When more and more hospitals join the resource-sharing network, telemedicine will have great potential to rebalance the geographically imbalanced health care resources and reduce healthcare access

disparity,” she said.

The use of telemedicine during the pandemic offers researchers an opportunity to take a more in-depth look. Sun plans to conduct further research to gather a better understanding of whether, how and why telemedicine functions in various healthcare situations. [WEB](#)

Telemedicine Services

Telemedicine application relies on different types of communication modes, including real-time audio/visual communication, image transfer, telephone conversations and email.

Examples:

- Consultation between physicians.
- Consultation between providers and patients.
- Remote diagnosis by specialists relying on transferred images, records and laboratory results.
- Remote mentoring specialists, such as for surgeons performing new or complicated procedures.

New toolkit provides rapid implementation guide for adopting telemedicine during Covid-19

Stepwise approach enabled telemedicine programme to get up and running in three days

Stay-at-home orders caught many medical practices and healthcare systems off guard, leaving them ill-equipped to rapidly adopt an efficient telemedicine platform so they could keep providing time-sensitive care to non-Covid-19 patients. To help organizations rapidly introduce telemedicine as an alternative option, a urology group in North Carolina developed a guide that enabled them

to convert all in-person visits to telemedicine in three days. They report their experience in an article in the *Journal of the American College of Surgeons*.

The guide, which the authors call a toolkit, uses a common electronic medical record (EMR) system, Epic, and widely available video portals like Google Duo and Doximity, to overcome social distancing

edicts. The toolkit relies on eight essential elements readily available in any medical organization new to telemedicine.

“One of our motivations for preparing the toolkit was to make it instantly available to any type of organization, large or small, that has an electronic medical record system,” said lead author Catherine Matthews, MD, FACS, FACOG, professor

of urology and gynaecology, Wake Forest Baptist Health, Winston-Salem, N.C.

Eight essential components

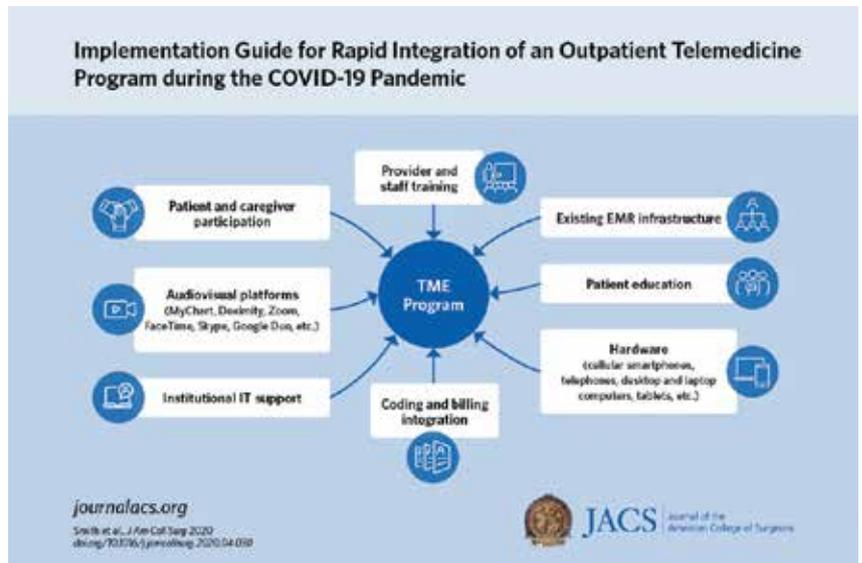
The eight essential components to successful telemedicine adoption are: an existing EMR, a one-hour training session for providers and staff, patient education on accessing the portal, availability of hardware like smartphones and video-capable computers, integration of new billing and coding functions, information technology support, an audiovisual platform, and patient and caregiver buy-in.

“The first thing you have to figure out is which video platform is going to work most consistently,” Dr Matthews said. Through trial and error, she and her coauthors decided on pairing up the Epic EMR with the Doximity provider networking app. Patients can access the Doximity platform through a link sent in a text message, eliminating the need for them to download an additional app or log into an online portal.

The article acknowledges other options available for telemedicine: the MyChart video capability incorporated in the Epic EMR system, and even services such as FaceTime, Skype, WhatsApp, and Google Duo.

However, in reporting on their experience, the Wake Forest Baptist urology group found disadvantages to some of these alternatives. MyChart, for example, requires patients to sign up for the patient portal and download two separate apps. “It can take quite a bit of time for staff to educate patients about this option,” Dr Matthews said. “Patients not only have to have the device and Internet access; they have to have enough aptitude to complete those three separate steps.” For providers using their personal devices, platforms like FaceTime and Skype disclose their personal cell phone or e-mail information. Doximity masks that personal contact information with the organization’s office number.

Another key component is the ability to teach both staff and patients quickly how to use the technology. “After selecting the platform, engaging the office staff to be on board with virtual visits is the next most important step,” said coauthor Whitney



Implementation Guide for Rapid Integration of an Outpatient Telemedicine Program amidst the Covid-19 Pandemic.

Smith, MD, a fellow in the female pelvic health service at Wake Forest Baptist Health. Staff training involved a one-hour session with a mock patient visit. The goal, she said, was to replicate all the key steps of the in-person visit in the virtual visit, from front desk check-in and nurse chart review to exam and checkout.

“Telemedicine is currently built as a physician platform,” Dr Matthews said. “We changed it to be inclusive of nurses; we engaged our nursing staff into the platform so that they continue to do the same roles that they do in person.”

Connection process

Days before the patient’s telemedicine appointment, a nurse calls to notify the patient the visit is being changed from an in-office to telemedicine, and then walks the patient through the connection process. On the day of the visit, the nurse calls again 15 minutes before the visit to review the chart, “just like they would if the patient was there in the office,” Dr Matthews said.

About three and a half weeks into their telemedicine experience, the Wake Forest Baptist Health urology physicians see about 15 patient visits via telemedicine a day compared to 30 in-office visits, Dr Smith added. Despite a lower total number of visits, Dr Matthews noted that a high rate of new telemedicine patient visits convert to surgery scheduling.

“Anecdotally, the efficiency from a surgical subspecialty perspective of the translation of new patient appointments to scheduling of future surgeries is currently 20 to 25 percent,” she said. “So a surgeon who’s not engaging in telemedicine is losing out on an opportunity to identify patients who will need surgery in the next two to three months.”

There have been barriers to wider implementation of telemedicine. Reimbursement for telemedicine services had been one. Another barrier can be technology. Small percentages of people still don’t have smartphones or home computers, and internet service can be limited, especially in some rural areas. Dr Smith said that the group had concerns about some elderly patients not having access to technology. “However, they’ve been able to engage younger family members to help them with the technology, and actually we’ve had very good success with that,” she said. For patients who don’t have video capability, the CMS waiver accommodates voice-only visits.

Reference:

Implementation Guide for Rapid Integration of an Outpatient Telemedicine Program amidst the Covid-19 Pandemic. *Journal of American College of Surgeons*.
 • doi: <https://doi.org/10.1016/j.jamcollsurg.2020.04.030>. **MEH**



Now more than ever, healthcare matters

Patient health and well-being, and the ability to deliver secure virtual care is no longer a luxury – it's a necessity. We're at an unprecedented crossroads in healthcare in which new technologies are being adopted at a rapid pace, and the healthcare landscape is being forever altered.

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As we partner with healthcare providers worldwide to deliver quality, secure care today, we also look toward tomorrow by setting a strong foundation for future success. We're a leader in healthcare transformation and we have the innovative solutions you need to deliver cutting-edge care. Every day, Cisco pushes the boundaries of what is possible in healthcare.

As a result of the health crisis, we're seeing major shifts in the delivery of care, including the transition to telehealth, rapid deployment of temporary field hospitals and clinics, increased call center volumes and remote work.

Transition to telehealth

To reduce physical contact between patients, clinicians and care teams, telehealth is quickly becoming the new normal. Both for primary care and for

Covid-19 triage and evaluation, healthcare professionals are using Cisco Webex devices and Cisco Webex meeting and messaging platforms to securely consult with patients virtually.

Rapid deployment of temporary field hospitals

To support a surge in demand for evaluation and testing while mitigating and preventing the spread of infectious disease, healthcare providers are setting up temporary, compartmentalized hospitals and clinics in mobile, pop-up and drive-through locations. By connecting these temporary locations with existing hospital and clinical spaces through Meraki or Cisco networking products, healthcare providers can maintain isolation for high acuity patients. To accelerate deployment, Cisco Customer Experience provides customers with trusted expertise.

Increased call centre volumes

Prior to visiting a hospital, clinic or temporary field hospital, symptomatic patients are being asked to first call a triage hotline. As a result, patients are turning to these contact centre agents to answer questions about symptoms, testing and treatment advice at greater volumes than ever before.

Enabling remote work

Businesses worldwide are implementing work from home mandates. But, what about clinicians and care teams in critical industries such as healthcare? We're seeing many health systems empower both administrators and healthcare staff to work remotely when possible, arming clinicians with tools for telehealth and large-scale video broadcasts for knowledge distribution and health system-wide meetings.

To address these use cases and to share challenges, best practices and resources to keep up with healthcare today, we're launching a new series entitled #HealthcareNow as part of a larger #PublicSectorNow series.

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In times of uncertainty, one thing remains clear. There has never been a more critical time to focus on care delivery, clinical experience and healthcare innovation.

- Explore how Cisco is transforming Healthcare.

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Philips telehealth solutions transform acute care

The demand for virtual care surged under Covid-19 – not just in the ICU with its limited number of beds but across the entire acute care continuum. The need to ensure specialist resources could be accessed regardless of physical presence meant telehealth became a necessity and not just a nice-to-have.

Healthcare authorities, concerned about specialist staff shortages, burnout, and the risk that doctors and nurses would be infected by the virus themselves, quickly adopted telehealth to ensure continuous and vital care delivery

Leading providers partnered with Philips, even before the pandemic, using Philips connected care solutions to help improve outcomes, improve the staff and patient experience and lower costs.

Examples include:



Philips eICU

Philips eICU enables a team of intensivists and critical care nurses to remotely monitor patients in the ICU regardless of patient location, supported by high-definition cameras, predictive analytics, data visualization and advanced reporting capabilities to support their frontline

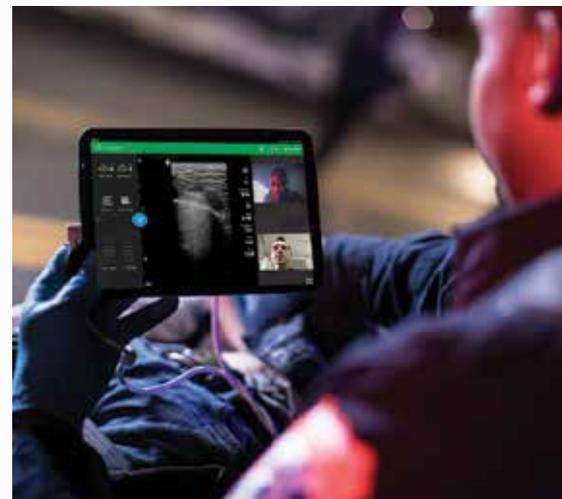
colleagues. Over the past decade and a half, more than 4.25 million patient stays have been monitored by Philips eICU program with hospitals seeing a reduction in mortality and length of stay after eICU deployment.

- For more information, visit: www.philips.ae/healthcare/resources/landing/teleicu

Philips Digital pathology

Cancer patient data is integrated for both oncologists, radiologists and pathologists, allowing them to collaborate efficiently, even when working remotely. The Philips platform supports streamlined preparation, enhances review and analysis, and empowers the cancer care team to reach clinical treatment decisions based on disease-specific dashboards, diagnostic images, and structured reports. Remote reviewing of pathological cases is essential to prevent delay in critical patient diagnosis and care, particularly during COVID-19. Pre-COVID-19, pathology labs that digitized their workflows across different sites reported improved collaboration and an average productivity gain of 21%.

- For more information, visit: www.philips.ae/healthcare/solutions/pathology



Philips tele-ultrasound

The Lumify with reacts is the world's first truly integrated teleultrasound solution. Lumify is app-based meaning high-quality portable ultrasound is available almost anywhere. In addition, the Reacts collaborative platform enables users to share the live ultrasound stream from a Lumify device with a remote colleague on a mobile device, tablet or computer, who can provide real time feedback without the need for physical proximity during scans. The live communications support better, more meaningful collaborations, especially at this time of the global pandemic when it is most needed.

- For more information, visit: www.philips.ae/healthcare/sites/lumify

Great Ormond Street Hospital offers access to world-leading specialist paediatric consultants from the comfort of your home

Great Ormond Street Hospital for Children (GOSH) in London has a bespoke telehealth service that facilitates two-way, real-time interaction between clinical experts, patients, families and other healthcare professionals around the world.

The telehealth service provides access to world leading experts in over 60 paediatric specialties and sub-specialties from the comfort of your own home. As a globally renowned children's hospital, GOSH champions innovation and provides ground-breaking treatments for the rarest and most complex conditions.

As a pioneer of cutting-edge and innovative medical technology, GOSH works at the forefront of the field to continuously deliver the medicine of the future. As part of this, it has expanded telehealth services for the benefit of families across the globe.

Specialist integrated technology allows GOSH's world-leading clinicians to provide a range of services including second opinions, virtual clinic appointments, multi-disciplinary team (MDT) reviews, training sessions, diagnostic and treatment planning support.

GOSH uses an MDT approach to ensure that the child is considered at the centre of everything. The MDT review means that a team including clinical consultants, specialist nurses, consultant radiologists, consultant pathologists, allied health professionals as well as social work and support services (as needed), review each child individually to share knowledge and thoughts on a child's unique treatment pathway. This means that each child's treatment is tailored specifically for their condition and experience.

All patients with complex conditions who are treated at GOSH will be discussed in an MDT that includes between 20-30 clinicians. Some patients with more complex needs may have multiple MDT reviews throughout their treatment pathway at GOSH.

GOSH's telehealth service is fully integrated into the hospital's electronic patient record system, so consultations are captured and preserved securely and directly into each patient's individual health record.

The telehealth technology includes encryption to ensure data protection and that all medical reports and patient records shared are securely protected. Videoconferencing systems include Zoom, Skype, WebEx, Microsoft Teams and Cisco, and all are certified and validated. All families need is a mobile device, tablet, or computer with wifi connection. GOSH was the first hospital in Europe to attain Stage 6 of both EMRAM and O-EMRAM and in September 2020 was awarded Stage 7 O-EMRAM, the first health institution in the UK to achieve this validation.

The International and Private Care team are experienced in providing support for international families who would like to make Telehealth appointments. The multilingual referral team and interpreting team are on hand to make the referral and booking process as smooth and efficient as possible. GOSH's in-house Interpreting Team are also available to provide expert clinical translation during Telehealth appointments if needed.

"We have an established range of telehealth services that can be accessed from the comfort of homes around the world," said Melanie Hiorns, Medical Director for International and Private Care. "Our world-class paediatric clinicians offer a range of services meaning



you may only need to visit the hospital when clinically relevant."

"At GOSH we put the 'child first and always,'" said Trevor Clarke, Director of International and Private Care. "As a world-leading paediatric hospital, you can be reassured that your child, and the whole family, has access to the best possible treatment and care available, whether in person or through our bespoke telehealth service."

– To find out more or book an appointment, please visit:

- www.gosh.ae/about-hospital/telehealth
- Email: Gulfoffice@gosh.nhs.uk
- Call: +971 4 3624722 

COVID-19 patient with irreversible lung damage recovers after double lung transplant

Baylor St. Luke's Medical Center recently performed its first lung transplant on a coronavirus patient whose lungs had been severely damaged by the virus. Paul Rodriguez, a young father with no pre-existing conditions, contracted the virus and pneumonia back in July in his hometown of San Antonio and had been hospitalized ever since.

Not long after being admitted to an area hospital in San Antonio, Rodriguez required intubation and the use of a ventilator. In late July, Rodriguez was stabilized on ECMO support, but his condition continued to deteriorate. Dr. Jeffrey Dellavolpe, Medical Director of the Adult ECMO Program at Methodist Hospital in San Antonio, contacted Dr. Puneet Garcha, Medical Director of Lung Transplantation at Baylor St. Luke's Medical Center, as it became clear that a lung transplant was his only chance of survival.

Rodriguez was transferred to Houston's Baylor St. Luke's Medical Center in mid-September for lung transplant evaluation. After undergoing an extensive evaluation, the medical review board approved him for a transplant and within a week of listing – on October 15 – Rodriguez had a brand-new set of lungs. Rodriguez' transplant was performed by the surgical team led by Dr. Gabriel Loor, Surgical Director of Lung Transplantation at Baylor St. Luke's Medical Center. He was successfully weaned off the ventilator and oxygen support.

Rodriguez underwent rehabilitation at Baylor St. Luke's before being discharged on November 24 and is expected to continue the rehabilitation program as part of his recovery. Rodriguez recently celebrated his 52nd birthday and a marriage proposal. He married his bride while hospitalized before his transfer to Houston.

Rodriguez is the first double lung transplant the hospital has performed on a coronavirus patient since the pandemic began. To date, only a handful of transplant



Paul Rodriguez undergoes a double lung transplant



Paul Rodriguez is discharged from hospital

centers in the U.S. have performed lung transplants on patients due to irreversible lung damage caused by the virus.

Drs. Garcha and Loor, who are also associate professors at Baylor College of Medicine, specialize in the clinical evaluation and management of patients with end-stage

lung diseases and lung transplantation. They lead a world-class lung transplant team at Baylor St. Luke's.

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Interview

Assisting the healthcare sector to go digital

Middle East Health speaks to Massimo Cannizzo, CEO and co-founder of GELLIFY Middle East about the company's digital services for the healthcare sector.

Middle East Health: Can you give us some background about Gellify and your work in the healthcare sector?

■ **Massimo Cannizzo:** GELLIFY is the first innovation enabler that invests in B2B software digital start-ups and connects them to traditional companies with the purpose of innovating their processes, products, and business in a fast and sustainable way. Headquartered in Italy with offices in the UAE, UK, and Spain, we offer corporates across several industries, including healthcare - Open Innovation and Digital Services, for accelerating and sustaining their transformation journey to the future of markets and people.

Connectivity, digital wearable, data science, and procedure innovation are currently crucial for the healthcare sector due to the increased demand post-COVID-19 disruption. The industry is experiencing a significant paradigm shift from a provider-centric approach, to a customer-centric approach, which facilitates a proactive attitude in patients by empowering them to better understand and monitor their own health by leveraging advanced technologies that are available on the market today. GELLIFY is active in helping healthcare providers, healthcare organizations and tech start-ups develop smart solutions and ecosystem platforms that impact the overall healthcare and wellness system, with connections between patients, physicians, hospitals, pharmacies, laboratories, insurance companies, paramedic service providers, researchers, and more.

MEH: What is Gellify offering healthcare companies in the Middle East region?

■ **MC:** As an open innovation advisory, Gellify provides health organizations with expertise and professional guidance to focus on their greatest strengths – build strategies and capabilities to take full advantage of digital technologies such as Artificial Intelligence, create end-to-end customer experience journey through Digital Healthcare Platforms, Telemedicine solutions, Healthcare Mobile Apps, Personal Health & Wellness Assistants, and Health-Monitoring by integrating data collected with selected Wearable Solutions.

MEH: Gellify has recently introduced 'Augmented Health'. Can you explain what this is and how it can benefit the healthcare industry and patients?

■ **MC:** We are observing a strong growth of awareness and interest related to health topics among people. The increased understanding and knowledge have also facilitated the convergence between healthcare and wellness services, and has increased the proactive attitude in people to monitor and manage preventively the physical and mental health factors that determine their own quality of life.

All the available information, wearable data, and advanced technologies like AI are supporting this paradigm shift and as such are “augmenting” the traditional healthcare and wellness sectors into a sin-



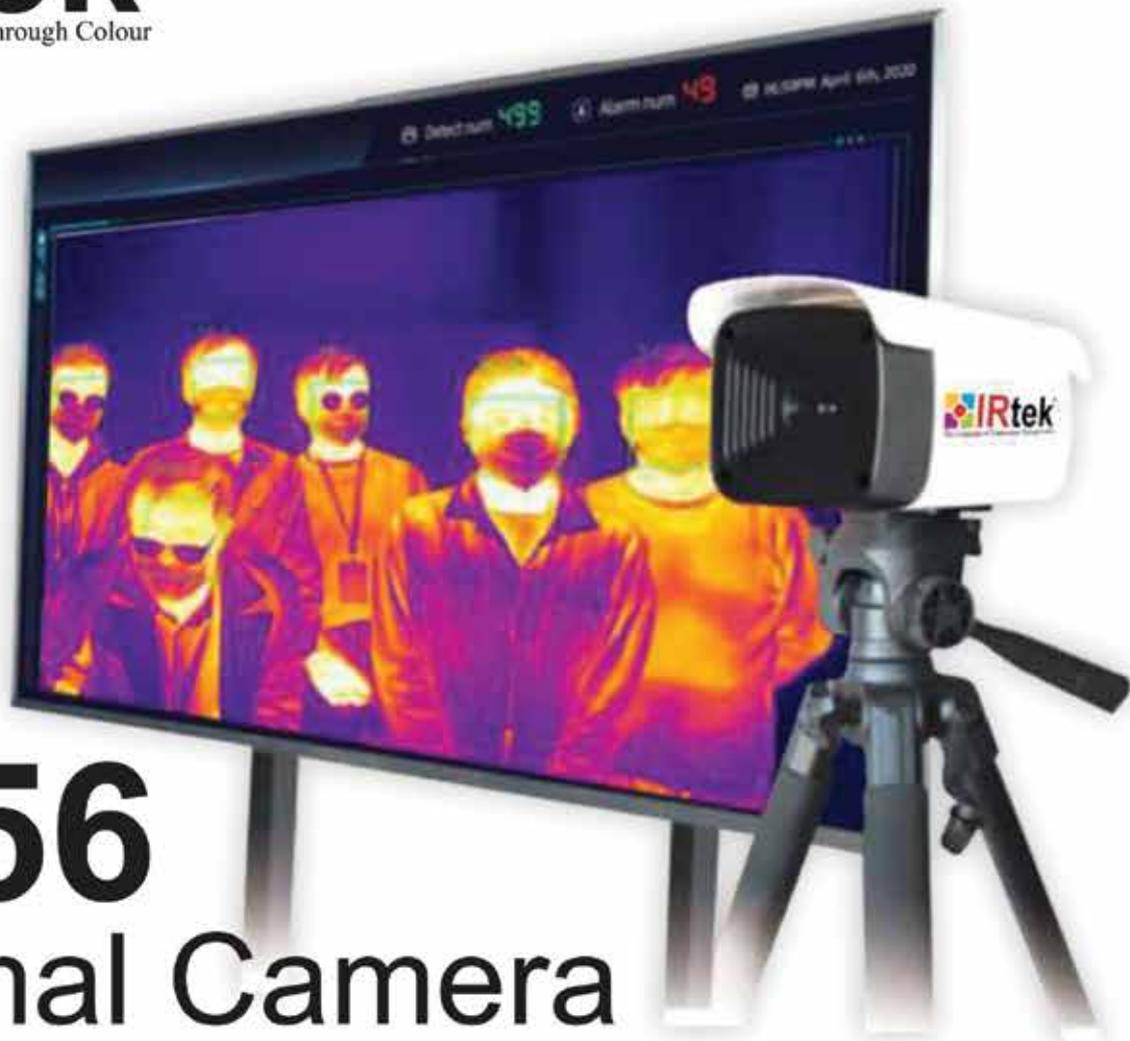
Massimo Cannizzo, CEO and co-founder of GELLIFY Middle East

gle integrated landscape where all components that concur to human health and happiness are accessible to people.

MEH: What is the current state of digital healthcare in the Middle East? Which countries in the region are leading in the field, and why?

■ **MC:** Middle Eastern countries' vision is based on advanced technology as a way to improve the way people live and work. Investments in technologies like AI, Big Data, IoT, and Blockchain are aiming to transform radically several industries at the same time. Healthcare is seen as one of the most important industries to transform in order to:

– Address some specific diseases and challenges in the Middle East region, such



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as diabetes, sedentary lifestyles, unhealthy food habits, as well as the novel Covid-19 virus that has drastically disrupted health. The continuous monitoring of disease trends, patients with chronic conditions, tracking data on the effectiveness of treatment, and keeping track of recovery improvements – are now all possible with the help of advanced technology embedded in what we call Digital Healthcare.

– In the long run, Middle Eastern countries are investing in innovation, to see how the convergence between digital technologies and biotechnologies can advance, and support human health and longevity, while offering the future residents a compelling environment to live and work and as well as enjoy their retirement. Countries like the UAE, Qatar & Saudi Arabia have already started this journey, leading internationally the innovation of healthcare.

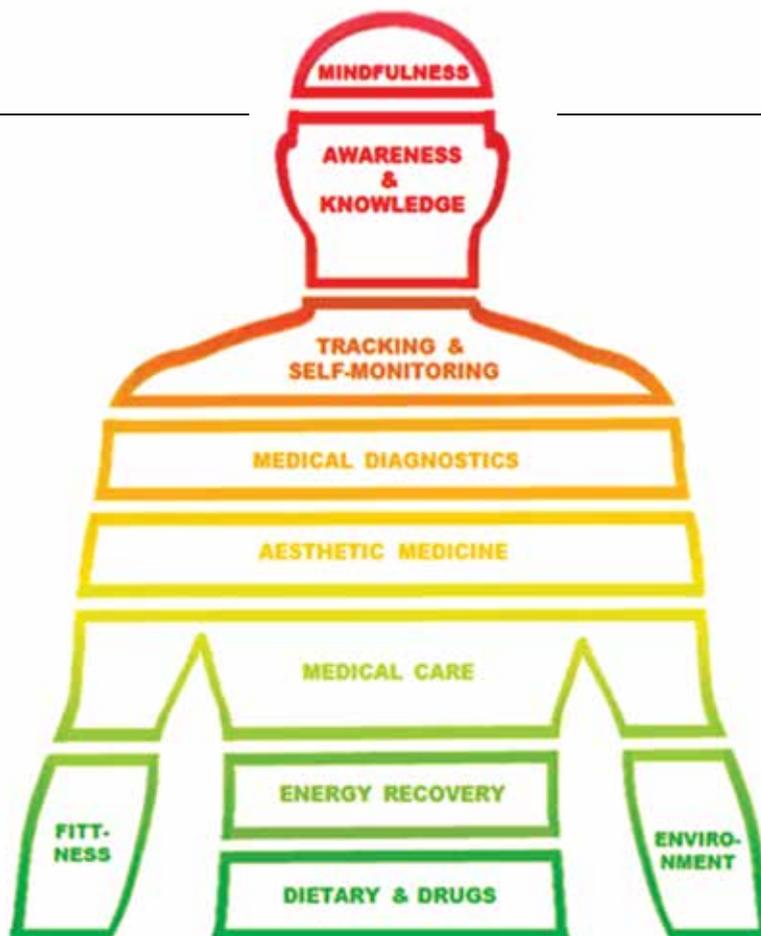
MEH: For those countries in the region that are lagging a bit in digital health implementation, what do you consider to be the main obstacles / challenges they face?

■ **MC:** Digital transformation is primarily about implementing a strategy that is supported by technology.

Many organizations recognize that they are neither ready to respond to digital trends nor satisfied with the progress on the initiatives they are undertaking, with the main challenges being not ready to make drastic and complex changes in the operating model, budget constrains into investing in the right resources, digital exclusion, privacy and security, rural connectivity. Healthcare providers need to understand that telemedicine solutions give the opportunity to get closer to “healthcare excellence”, as it allows people living in less advanced countries to leverage internet connection and gain access to international healthcare consultants and providers from advanced GCC countries.

MEH: What do you consider to be the best way to overcome these challenges?

■ **MC:** First, organizations need to resist the urge to go back to the way things were. Digital interaction is the way of



the future. Second, organizations need to start prioritizing data and not only the traditional research data but private patient data collected through the new wearable sensors — gather it, manage, and understand it. In health care, data affects nearly every aspect of the business, from research, education, and patient care to consumer privacy and cybersecurity. Third, companies need to start thinking like their patients: we are living in the digital era and moving toward a patient-driven healthcare model, where with a few clicks, they can make informed decisions about how they spend their money — including on health care. Healthcare providers need to deploy skills and cultural mindset change deeply into their organizations to provide easy access to healthcare, or consumers will find another entity that does.

MEH: What technology solutions are currently available and what can we expect in this field over the next few years?

■ **MC:** Existing new technologies have already set the fundamentals to build the new digital healthcare ecosystem, such as mobile health applications, remote monitoring, wearable devices that monitor vitals 24/7, ingestible data-generating IoT sensors, holographic and robotic-assisted surgery and those are just a few. The next

wave of technology will be more accessible, preventative, lower in cost, efficient, high in quality, less invasive, and deeply personalized.

But what will make more difference is the great empowerment of medical research and diagnostics, that AI is bringing into the healthcare and wellness landscape. We are working with startups, that have developed solutions, able to detect a high occurrence probability of some diseases, just using face or voice scanning, elaborated by sophisticated AI algorithms.

MEH: What lies ahead on the road to digital healthcare, in general?

■ **MC:** The future of digital healthcare or healthcare is not easy to pinpoint, but we believe it will be shaped by the emerging technological trends with patients being at the centre. In particular, areas that are related to digital health, genomics, and extended longevity should see further upside potential over the longer term, the rise of chronic diseases associated with aging, as well as the growing financial burden of medical care. The growth of interconnectivity and the more efficient collection and transfer of medical data are sure to make digital care more ubiquitous in people’s lives and will bring a big change in lifestyle. MEH

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Interview

Delivering high quality, safe care to patients at Mediclinic City Hospital, Dubai

In this interview with Ali Naffa, Quality and Safety Officer at Mediclinic City Hospital, we hear how the organisation is committed to delivering the highest standards of care to patients and the measures put in place across the hospital, including the adoption of clinical decision support solutions, to drive best in class healthcare services.

Ali, please tell us about your role

I am the Quality and Safety Officer at Mediclinic City Hospital and I am in charge of the clinical and non-clinical quality programme, which includes risk management and accreditation. My role is to make sure we have the resources for maintaining clinical outcomes and a safe clinical and non-clinical environment. I'm responsible for maintaining compliance with regulatory requirements and accreditation standards. I also look into how we can streamline processes around the hospital to ultimately improve clinical outcomes for patients and patient satisfaction.

One challenge we face is that this is a big hospital with many specialties and a diverse workforce that comes from a wide variety of healthcare systems.

There is a need to standardise practices as much as possible, though getting everybody on board can be a challenge, when there are different schools of thought and people are used to different clinical guidelines.

How do you standardise clinical practice?

One thing we do is develop clinical guidelines. Clinicians discuss different approaches to treatment, and they decide on the best approach based on evidence and research studies from around the world.

Clinical information resources from Wol-

ters Kluwer, such as Lexicomp, feed into this process by providing a unified source for medication safety. Lexicomp provides a one-stop shop for doctors, nurses, or pharmacists to have discussions using the same reference. And that actually saves a lot of time for everybody. We also use UpToDate, which comes in at the beginning of the process when we are looking for sources to develop the guidelines. It plays a key role in summarising all the evidence in one synopsis.

How do you ensure that City Hospital is delivering safe care to patients?

Every process and service in the hospital has a document that outlines what should be done for each and every scenario, and that document is evidence-based.

We set expectations through policies, and then we train staff and ask them to read the policies, the procedures, and the competencies. After training, we monitor performance and we do this mainly through direct observation. We observe people practicing, and evaluate them through an audit tool.

We also ask the managers to report on a number of key performance indicators (KPIs) based on their area of practice, and we benchmark against other business units within Mediclinic — including our hospitals in South Africa and Switzerland.

Lastly, we use patient satisfaction surveys to help monitor and improve performance. We have an annual strategy with different areas to focus on each year. One of the key areas last year was medication safety, in terms of improving the prescription process and accuracy of the prescription through appropriateness reviews to reduce error and ensure patient safety.

How are you ensuring compliance to guidelines?

Compliance is usually monitored through direct observation and reported performance measures. We review the records for certain diagnoses that have clinical guidelines — stroke for example — and we check for all patients who had a stroke diagnosis to see whether the guidelines were followed.

Then we have another approach whereby the regulator comes over and checks as an unbiased third party. Joint Commission International (JCI), a not-for-profit organization which accredits and certifies healthcare organizations and programs worldwide, also falls under this category of an independent third party that can audit and provide feedback.

How are pharmacists, doctors, and nurses using Lexicomp to help them make appropriate decisions?

Pharmacists like to use the system for checking the therapeutic doses, allergies and for checking indications. Sometimes pharmacists get medications with unusual indications and they want to make sure that this is a new indication for a known medication, for example.

Doctors, on the other hand, use multiple resources, and Lexicomp is now one of the tools they use. They use it to reach agreement with the pharmacists on dosing. Nurses need guidance on how to administer medication and also how to identify any interactions with food.

What has been the benefit of having Lexicomp available to your clinicians?

I have noticed a decrease in the number

of medication errors or near misses that come with wrong prescriptions after the recent Lexicomp training. A near miss is an error in the making that hasn't reached the patient. So if a prescription is wrong or if a doctor prescribes a medication outside the usual dose, and the pharmacist picks up on that, and corrects it, then that is a near miss.

How do you encourage clinicians to use Lexicomp?

We make them all aware of the resource at their initial orientation when they start working at the hospital. We also discussed with Wolters Kluwer how we could create internal capability to provide ongoing training as well as develop methods of evaluating awareness and usage of Lexicomp.

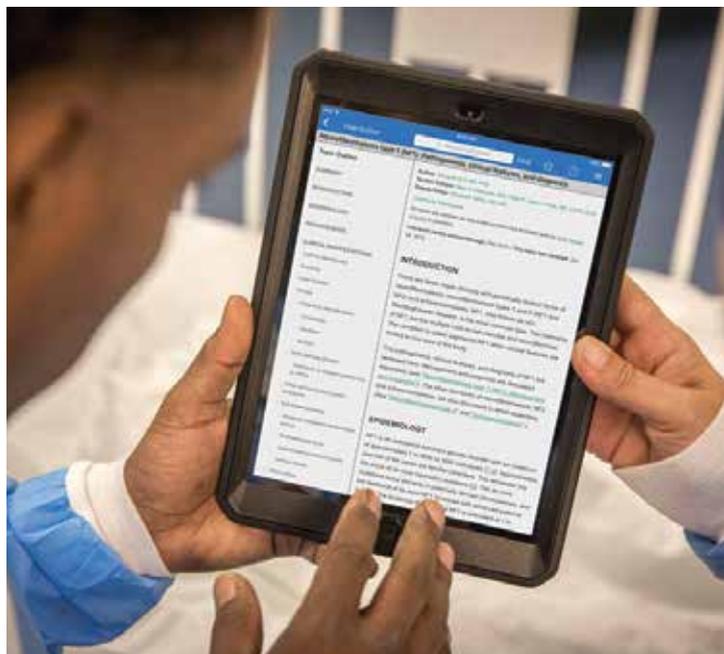
Our Wolters Kluwer trainer had a genuine interest in making sure that the ideas were implemented. Her passion and belief in Lexicomp helped ensure that our teams adopted it quickly.

Can you tell us a bit more about how Lexicomp is used to prepare for JCI accreditation?

One of the standards required in the medication management chapter requires an appropriateness review. 'Appropriateness review' is a term that JCI uses to refer to a process whereby the clinician checks whether the medication is appropriate for the patient. This includes checking for dosage, interaction, allergies, contraindications, etc.

Now, we don't dispense all the medication from our pharmacy – we keep some stocks within our units in case of emergency where there may not be a pharmacist. The JCI standard says that if there is no pharmacist, then either another physician or a nurse should conduct the appropriateness review.

To be able to conduct an appropriateness review, the doctor or nurse should receive training and also have a reference tool. Nurses have been trained to use Lexicomp as an appropriateness review tool to ensure that the medication is appropriate for the patient. In terms of complying with that particular JCI standard, which



has clear implications for patient safety, Lexicomp plays a critical role in achieving compliance.

How do you use UpToDate to support your quality and accreditation process?

There is a JCI standard that requires a hospital to create five guidelines for any high-volume or critical diagnosis. When a guideline is created, we need to document where the information and evidence came from.

Checking, evaluating and comparing evidence is a sizeable task that can be made much quicker and easier by using a tool such as UpToDate, which already synthesises the evidence and provides recommendations. We use UpToDate to identify the sources and create guidelines.

What impact do you think clinical decision support (CDS) resources such as Lexicomp and UpToDate have on performance?

I know that CDS resources have a positive impact on performance, mainly because we know from studies that human performance declines over time.

Although our human decision-making systems retain multiple variables at any point in time, we know there are limitations in terms of the number of variables that can be retained in order to make the best decisions. CDS solutions provide a great supplement to the personal decision-making system.

- Original interview conducted with Ali Naffa, Jan 2020.
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Does biodiversity evoke happiness?

A high biological diversity in our immediate vicinity is as important for life satisfaction as our income, according to new research published in *Ecological Economics*. Nature conservation thus constitutes an investment in human well-being, according to the researchers.

Scientists from Senckenberg, the German Centre for Integrative Biodiversity Research (iDiv), and the University of Kiel have shown for the first time, that all across Europe, the individual enjoyment of life is correlated to the number of bird species in one's surroundings. Their study shows that an additional ten percent of bird species in the vicinity increases the life satisfaction of Europeans at least as much as a comparable increase in income.

Under the current pandemic conditions, activities out in nature are a popular pastime. The beneficial effects of a diverse nature on people's mental health have already been documented by studies on a smaller scale. Scientists of the Senckenberg Gesellschaft für Naturforschung, the iDiv, and the University of Kiel now examined for the first time whether a diverse nature also increases human well-being on a Europe-wide scale.

To this end, the researchers used the data from the "2012 European quality of Life Survey" to study the connection between the species diversity in their surroundings and the life satisfaction in more than 26,000 adults from 26 European countries. Species diversity was measured based on the diversity of avian species, as documented in the European breeding bird atlas.

"Europeans are particularly satisfied with their lives if their immediate surroundings host a high species diversity," explains the study's lead author, Joel Methorst, a doctoral researcher at the Senckenberg Biodiversity and Climate Research Centre, the iDiv, and the Goethe University in Frank-

furt. "According to our findings, the happiest Europeans are those who can experience numerous different bird species in their daily life, or who live in near-natural surroundings that are home to many species."

Birds are well-suited as indicators of biological diversity, since they are among the most visible elements of the animate nature – particularly in urban areas. Moreover, their song can often be heard even if the bird itself is not visible, and most birds are

diversity is as important for their life satisfaction as is their income," explains Prof. Dr. Katrin Böhning-Gaese, director of the Senckenberg Biodiversity and Climate Research Centre, professor at the Goethe University in Frankfurt am Main, and member of the iDiv. This result becomes particularly obvious when both values increase by ten percent. Fourteen additional bird species in the vicinity raise the level of life satisfaction at least as much as an extra 124 Euros

per month in the household account, based on an average income of 1,237 Euro per month in Europe.

According to the study, a diverse nature therefore plays an important role for human well-being across Europe – even beyond its material services. At the same time, the researchers draw attention to impending health-related problems. "The Global Assessment 2019 by the World Biodiversity Council IPBES and studies of avian species in agricultural landscapes in Europe clearly show that the biological diversity is currently undergoing a dramatic decline. This poses the risk that human well-being will also suffer from an impoverished nature. Nature

conservation therefore not only ensures our material basis of life, but it also constitutes an investment in the well-being of us all," adds Methorst in conclusion.

Reference:

The importance of species diversity for human well-being in Europe. *Ecological Economics*, doi: 10.1016/j.ecolecon.2020.106917



popular and people like to watch them. But there is also a second aspect that affects life satisfaction: the surroundings. A particularly high number of bird species can be found in areas with a high proportion of near-natural and diverse landscapes that hold numerous greenspaces and bodies of water.

"We also examined the socio-economic data of the people that were surveyed, and, much to our surprise, we found that avian

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