

# Middle East HEALTH

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May - June 2021

## Gender Bias

Heart attack diagnosis missed in women more often than in men

### COVID-19

Infection does not fully protect young people against reinfection

### Miscarriage

Experts call for worldwide reform of care and treatment

#### In the News

- WHO appoints first members to Council on the Economics of Health for All
- Cleveland Clinic Abu Dhabi performs UAE's first deep brain stimulation operation for Parkinson's
- Abu Dhabi Stem Cells Centre treats first Emirati patient
- Newly discovered Darobactin could be much-hoped-for novel antibiotic



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# Prognosis

## Gender bias

In this issue our main focus is on women's health. We look at some of the latest studies published in leading journals as well as one presented at the European Society of Cardiology in March, which highlights the gender gap in diagnosis of acute coronary syndrome in women. As well as the finding that women more often presented later than men with chest pain, doctors' initial diagnosis of acute coronary syndrome was more likely to be considered the cause of chest pain in men compared to women. The researchers note that the findings suggest a gender gap in the first evaluation of chest pain, with the likelihood of heart attack being underestimated in women. There are similar findings from the American Heart Association which published a series of research papers earlier this year in their journal under the banner 'Go Red for Women'. The authors note specifically that "although cardiovascular disease is the leading cause of death in men and women, women are less likely to be diagnosed and receive preventive care and aggressive treatment compared to men". It's important that doctors are aware of this gender bias when diagnosing women with chest pain as this may go some way to ensuring that more women receive the appropriate treatment.

Also in this issue in our COVID-19 Update, we look at an observational study in young people aged of 18 to 20, which shows that this age group is susceptible to reinfection even if they previously had COVID-19. It highlights the importance of them also being vaccinated to reduce transmission of the virus. And in rather scarce positive news about transmission of the virus, a study by the Karolinska Institute in Sweden finds that babies born to COVID-19 infected mothers have a very low risk of infection. The authors suggest that in such instances it is perhaps not necessary to remove the babies from their mothers following birth as is generally standard practice currently.

Cleveland Clinic Abu Dhabi is regularly in the news for performing first-of-its-kind treatments in the region. One of the most recent is the successful use of deep-brain stimulation for the treatment of Parkinson's. You can read more about this and other interesting local news in the Middle East Monitor.

Arab Health will have both an online and a live format this year. The online version runs from 23 May to 22 July. The live exhibition at Dubai World Trade Centre runs from 21-24 June. If you are in Dubai to attend the event, we trust your meetings will be productive and prosperous.

Please remember to visit our new website – [www.MiddleEastHealth.com](http://www.MiddleEastHealth.com) – where we regularly provide healthcare news updates and informative research reviews that we hope you will find useful.

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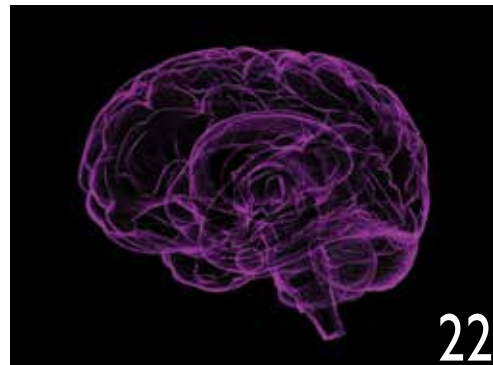
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\*\*All data are based on the Access SARS-CoV-2 Antigen Assay Instructions for Use (C68183)

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# middle east monitor

Update from around the region



## Mayo Clinic Laboratories and American Hospital Dubai form strategic partnership

Mayo Clinic Laboratories and American Hospital Dubai have announced a strategic partnership aimed at improving advanced laboratory diagnostics in the Dubai region. Under the agreement, the two organizations will begin delivering laboratory testing through a collaboration based out of American Hospital Dubai in early 2021.

“Our goal for this relationship is to offer advanced laboratory testing to better help clinicians answer complex medical questions for their patients,” said William Morice II, M.D., Ph.D., president of Mayo Clinic Laboratories. “Effective laboratory diagnostics is critical to improving patient care, and, by bringing this service straight to the region, we are dramatically reducing test turnaround times.”

Mayo Clinic Laboratories and American Hospital Dubai also will work together to improve access to complex laboratory diagnostics for the region’s providers. **MEH**

## Abu Dhabi Stem Cells Centre treats first Emirati patient

The Abu Dhabi Stem Cells Center (ADSCC), in collaboration with Sheikh

Khalifa Medical City, has treated its first Emirati patient through the Abu Dhabi Bone Marrow Transplant program (AD-BMT). The transplant was performed in Abu Dhabi, and the patient is recovering well at home.

The AD-BMT program was established by ADSCC in August 2020 and has been treating patients since its inception in collaboration with Sheikh Khalifa Medical City. The AD-BMT program relies on stem cell therapy to treat patients with hematological and oncological illnesses, including bone marrow transplantation, which is an established stem cell-based treatment for a number of blood malignancies. These include multiple myeloma, plasma cell leukemia, large diffuse B-cell lymphoma, and Hodgkin lymphoma, as well as autoimmune diseases and benign hematological conditions such as thalassemia, among others.

In less than a year, eight patients with different types of blood malignancies have been treated. AbdelRahman Al Jaber, the eighth patient in question, said: “I wasn’t aware that stem cell therapy was available in the UAE, but I’m grateful to God and to our leader, His Highness Sheikh Mohamed Bin Zayed – may he have a long life – for supporting the center so that I don’t have to travel and can recover at home in Abu Dhabi amongst my family.”

Dr Yendry Ventura, Specialist in Immunology and General Manager of ADSCC, said, “As immunologists, we strive to identify innovative methods to treat conditions that are known to be challenging to cure. Using stem cell therapy in the form of bone marrow transplants is one of the most well-known and established methods to treat various conditions of blood malignancies.”

ADSCC was founded with the primary objective of meeting growing domestic and regional demand for advanced medical services and the most innovative treatments in the UAE. **MEH**



Dr Alya Al Mazrouie, ICLDC Acting Executive Director

## ICLDC accredited as Collaborating Centre for Obesity Management

Imperial College London Diabetes Centre (ICLDC) has become the first centre in Abu Dhabi and the third in the UAE to be accredited as a Collaborating Centre for Obesity Management (COM) by the European Association for the Study of Obesity (EASO).

Under the EASO COM scheme, obesity management centres are accredited against a set of stringent criteria and in accordance with accepted European and academic guidelines to ensure consistently high standards in different countries across the world.

The EASO Obesity Management Task Force completed its assessment of ICLDC and granted it an initial two-year EASO International Affiliate COM status from 1 April this year. In addition, the body has recognised two of ICLDC’s experts – Dr Mohgah El Sheikh and Dr Matthew Allum, both consultant endocrinologists and diabetologists – as EASO National Clinical Fellows.

ICLDC Acting Executive Director, Dr Alya Al Mazrouie, commented: “We are delighted to have received this recognition, which affirms our expertise in managing obesity alongside diabetes.”

It is estimated that over 37% of adults in the UAE are living with obesity and its presence is closely linked with a large number of health conditions, including heart disease and type 2 diabetes. **MEH**

## BMJ Innovations partners with WISH

BMJ Innovations has announced a strategic partnership with The World Innovation Summit for Health (WISH), Qatar Foundation's global health initiative. The partnership will help advance their shared vision of a healthier world by disseminating evidence-based and best-practice innovation.


Ashley McKimm, Editor-in-Chief of BMJ Innovations, said: "WISH and BMJ Innovations have a shared vision of a healthier world through better global collaboration, which will be particularly important leading on from the current pandemic. Alongside the huge human cost of covid-19, we've seen many innovations, such as mRNA vaccines and AI, that will make a positive legacy on health long after we've brought the pandemic under control. I hope that this new partnership with WISH will help accelerate the adoption of these and other innovations to improve health outcomes worldwide."

Sultana Afdhal, Chief Executive Officer of WISH Qatar, said: "The World Innovation for Health was created to promote, showcase and encourage innovation in the health sector. Through its mission of gathering leading healthcare experts, it does this to seek novel solutions to global health challenges."

"More than ever, we are seeing the significant benefit of nurturing a robust relationship between health and innovation, so we are very excited to become the strategic partner of BMJ Innovations and look forward to actively working together to highlight and scrutinise the best thinking in this vital sector."

Since its first publication in 2015, *BMJ Innovations* (the specialist peer-reviewed online journal from BMJ) has focused on emerging digital health, medical devices, process and system innovations. This new partnership with WISH will increase the publication of the best available original

research, provide greater global access to evidence-based innovation practice, and support the development of themed issues on topics where new innovations can make an impact.

- Access BMJ Innovations: [www.innovations.bmj.com](http://www.innovations.bmj.com)
- Access WISH: [www.wish.org.qa](http://www.wish.org.qa) 

## Cleveland Clinic Abu Dhabi performs UAE's first deep brain stimulation operation for Parkinson's

Four Emirati nationals are looking forward to taking back their lives from Parkinson's disease after benefiting from the UAE's first deep brain stimulation operations.

The surgeries, which each lasted between four and eight hours, took place over a period of four days following comprehensive evaluations to ensure the patients were good candidates for the surgery. Evaluations for deep brain stimulation involve a multidisciplinary team of neurologists, neurosurgeons, physical therapists, speech therapists, and a neuropsychologist in order to cater to each patient's specific needs.

The complex surgery can significantly reduce the symptoms patients experience, reducing their need for medication and improving their quality of life. The electrodes are controlled by a small device implanted under the patient's skin.

"Deep brain stimulation is an intricate procedure that will transform both the lives of patients and the way Parkinson's disease is treated in the UAE. The level of expertise required to offer this surgery is phenomenal and I am extremely proud of the whole team for coming together to offer these patients a new level of care and a life less reliant on medication and with fewer symptoms," said Dr Florian Roser, Chair of the Neurological Institute at Cleveland Clinic Abu Dhabi.

During the surgery, neurosurgeons implant electrodes into precise areas of



the brain to block rogue signals that cause motor problems such as tremors.

"Deep brain stimulation is a particularly complex endeavour that relies on detailed planning and submillimetre precision. Using some of the world's most advanced imaging techniques, our team is able to determine the exact areas of the brain causing a patient's symptoms. Once identified, the challenge is to place the electrode at those precise points through the brain. Each case is unique and dramatically different to most surgeries," said Dr Tanmoy Maiti, the neurosurgeon who performed the surgeries at Cleveland Clinic Abu Dhabi.

Reflecting the close level of collaboration between colleagues, Cleveland Clinic Abu Dhabi's deep brain stimulation program draws on Cleveland Clinic in Ohio's more than twenty years of experience in the field, performing more than 150 deep brain stimulation surgeries per year. The surgical team received support in the UAE's first deep brain stimulation surgeries from Dr Andre Machado who flew to Abu Dhabi from the United States for the surgeries.

The patients were younger than the average group with Parkinson's disease, which is most common in people over the age of 60. However, a growing proportion of patients around the world are being diagnosed with early onset Parkinson's disease.



“Parkinson’s disease can have a tremendous impact on a person both physically and mentally. As their symptoms progress, they can begin to feel isolated and alone, unwilling or unable to live their life as they did before. This is particularly true of early onset Parkinson’s that can affect people in the prime of their lives, depriving them of things many of us take for granted,” said Dr Shivam Om Mittal, a neurologist specialized in Parkinson’s disease and movement disorders at Cleveland Clinic Abu Dhabi.

This was particularly true for Mohammed Al Aryani, a 49-year-old who was diagnosed with Parkinson’s disease in 2003 at the age of 32. As his symptoms progressed, he shied away from social contact due to the severity of his symptoms and the shame he associated with them.

“I left my job, stopped my studies and even stopped leaving home for a long time. I wasn’t able to see my own children because I didn’t want them to see me like this. After my surgery, I would like to continue my studies and get my bachelor’s degree, to be able to enhance and move ahead with my career. Most importantly, I cannot wait to be close to my children again and live a normal life,” said Mohammed.

Speaking ahead of his surgery, Rashed Alhebsi, who was diagnosed with Parkinson’s in 2015, was excited at the prospect of getting his life back.

“I could not move properly or go to work normally. My mental health deteriorated, and I could not socialize anymore. When my doctors told me about deep brain stimulation, I went online and did my research about the procedure, watched videos, and read a lot. I am proud of the UAE leadership and proud to be an Emirati. We have the best healthcare technology and skills. I look forward to becoming more active and socializing again,” said Rashed.

The Neurological Institute at Cleveland Clinic Abu Dhabi, offers a multidisciplinary approach to patients with movement disorders. The team includes neurologists, neurosurgeons, physical therapists, speech therapists, nurses and others in order to

cater to each patient’s specific needs. The entire team is permanently based in Abu Dhabi and available for patients at any time before or after surgery. **MBH**

## SEHA, Mayo Clinic mark first anniversary of Sheikh Shakhbout Medical City joint venture

Abu Dhabi Health Services Company (SEHA) and Mayo Clinic are marking the first anniversary of their joint venture that launched and operates Sheikh Shakhbout Medical City (SSMC), one of the United Arab Emirates’ largest hospitals providing care for patients with serious and complex medical conditions.

SSMC reflects SEHA’s and Mayo Clinic’s shared commitment to accelerate the development of the nation’s health care industry and enhance the quality of patient care in the UAE and beyond. Through their collaboration, they envision the hospital, opened in January 2020, evolving to become an international medical destination.

Since opening, SSMC completed more than 270,000 outpatient visits, cared for over 17,000 inpatients, and provided emergency care to more than 94,000 patients. SSMC performed over 8,500 surgical procedures, including the UAE’s first spiral enteroscopy and first artificial intelligence-aided colonoscopy. The hospital received more than 27,500 referrals last year.

“As we celebrate SSMC’s first anniversary, we recognize the facility’s valuable contributions to the region’s health care ecosystem,” said Salem Al Nuaimi, chairman of SEHA. “From bringing innovative, evidence-based treatment to the community’s doorstep, to training and developing the local medical leaders of tomorrow, to responding effectively to the community’s needs, SSMC is dedicated to patient-centred care, invested in the development of the nation’s health care system and further



establishing Abu Dhabi as a global destination for treatment.”

“SSMC’s first year of operation saw the core ingredients of the joint venture come to life, with the continuous and seamless transfer of talent, knowledge and expertise,” says G. Anton Decker, MBBCh, president, International at Mayo Clinic. “With international talent immersing themselves in the local culture of excellence, and regional health care professionals gaining firsthand insight into international best practices, SSMC is on track to combine Mayo Clinic’s expertise with SEHA’s rich legacy, offering the community the very best in health care.”

At the onset of the COVID-19 pandemic, SSMC mobilized to provide a swift, coordinated response. Last May, 91 Mayo Clinic health care providers including physicians, nurses and other staff arrived in the UAE to assist temporarily, which allowed SSMC to expand its capacity and elevate its care for patients. SSMC introduced connected care to allow care teams to connect directly with patients and deliver health care remotely. Over the past year, SSMC saw more than 23,000 patients via telemedicine, with remote appointments increasing 325% at the height of the pandemic.

SSMC implemented AskMayoExpert <<https://askmayoexpert.mayoclinic.org>> an online resource that delivers Mayo Clinic physician-vetted medical knowledge and answers to common clinical questions. Physicians can engage with Mayo Clinic specialists about a patient’s care plan through the information-sharing technology eConsults. **MBH**



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- Versatility



Giving Shape to Ideas



# worldwide monitor

Update from around the globe



## RTS,S malaria vaccine reaches more than 650,000 children in Ghana, Kenya and Malawi through groundbreaking pilot programme

Two years on from the launch of a pilot programme, more than 1.7 million doses of the world's first malaria vaccine have been administered in Ghana, Kenya and Malawi, benefitting more than 650,000 children with additional malaria protection.

The number of children reached in this

relatively short period indicates strong community demand for the vaccine as well as the capacity of the countries' child immunization programmes to deliver the vaccine on a novel schedule (4 doses up to about age 2 years).

At a time when global progress in

malaria control has stalled, the protection provided by the RTS,S malaria vaccine, when added to currently recommended malaria control interventions, has the potential to save tens of thousands of lives per year.

"Ghana, Kenya and Malawi show that existing childhood vaccination platforms can effectively deliver the malaria vaccine to children, some of whom have not been able to access an insecticide treated bed net or other malaria prevention measures," said Dr Kate O'Brien, WHO Director of the Department of Immunization, Vaccines and Biologicals. "This vaccine may be key to making malaria prevention more equitable, and to saving more lives."

"Over the last 2 decades, we have achieved remarkable results with existing malaria control tools, averting more than 7 million deaths and 1.5 billion cases of the disease," says Dr Pedro Alonso, Director of the WHO Global Malaria Programme. "However, progress towards key targets of our global malaria strategy remains off course. To get back on track, new tools are urgently needed – and malaria vaccines must be a critical

### WHO initiative to stamp out malaria in 25 more countries by 2025

The WHO has launched an initiative on the occasion of World Malaria Day on 25 April which aims halt transmission of malaria in 25 more countries by 2025.

Of the 87 countries with malaria, 46 reported fewer than 10,000 cases of the disease in 2019 compared to 26 countries in 2000. By the end of 2020, 24 countries had reported interrupting malaria transmission for 3 years or more. Of these, 11 were certified malaria-free by WHO.

"Many of the countries we are recognizing today carried, at one time, a very high burden of malaria. Their successes were hard-won and came only after decades of concerted action" said Dr Tedros Adhanom

Ghebreyesus, WHO Director-General. "Together, they have shown the world that malaria elimination is a viable goal for all countries."

Though each country's elimination journey is unique, common drivers of success have been seen across all regions.

"Success is driven, first and foremost, by political commitment within a malaria-endemic country to end the disease," said Dr Pedro Alonso, Director of the WHO Global Malaria Programme. "This commitment is translated into domestic funding that is often sustained over many decades, even after a country is malaria-free," he added.

Most countries that reach zero malaria have strong primary health care systems that ensure access to malaria prevention,

diagnosis and treatment services, without financial hardship, for everyone living within their borders – regardless of nationality or legal status.

Robust data systems are also key to success, together with strong community engagement. Many countries that eliminate malaria have relied on dedicated networks of volunteer health workers to detect and treat the disease in remote and hard-to-reach areas.

• A new WHO report summarizes progress over the last 3 years and lessons learned in 21 countries supported by the WHO in their efforts to get to zero malaria cases within the 2020 timeline. Access the report here: <https://bit.ly/3vU4TxR>




component of the overall toolkit.”

Insights generated by the pilot implementation will inform a WHO recommendation on broader use of the vaccine across sub-Saharan Africa. Global advisory bodies for immunization and malaria are expected to convene in October 2021 to review RTS,S data and consider whether to recommend wider use of the vaccine.

“In some ways malaria is the child health emergency of a lifetime – or many lifetimes – in Africa. We applaud the work of participating countries that has resulted in malaria vaccine pilots with strong vaccination coverage that will add to our understanding of the RTS,S vaccine’s potential to improve child health and strengthen malaria control – and, potentially, reverse trends,” says Dr Akpaka Kalu, Team Leader for Tropical and Vector-borne Diseases in the WHO African Region.

Meanwhile, the most recent *World malaria* report found that over the last four years progress in reducing malaria has hit a plateau. In 2019, there were an estimated 229 million malaria episodes and 400,000 deaths from the disease. Over 90% of malaria deaths occur in Africa, most of which are in young children.

RTS,S is the first and, to date, the only vaccine that has been shown to reduce malaria in children, including life-threatening severe malaria, related hospital admissions and the need for blood transfusions. The vaccine is currently being piloted in areas of moderate to high malaria transmission where malaria can account for up to 60% of childhood outpatient visits to health facilities.


The Malaria Vaccine Implementation Programme supports the country-led introduction of the RTS,S vaccine in childhood immunization; and, separately, the evaluation of how best to reach children with the recommended four-dose regimen, the impact on severe malaria and on lives saved, and vaccine safety in routine use. 

## WHO sets up global dementia platform to share knowledge

A new online platform to facilitate the exchange of information and knowledge on dementia was launched 5 May. The new tool, the Global Dementia Observatory Knowledge Exchange Platform, contains key resources to support the implementation of the Global action plan on the public health response to dementia 2017-2025 and its seven action areas. It provides a space for stakeholders to share resources, such as policies, guidelines, case studies and examples of good practice, to facilitate mutual learning and promote the exchange of knowledge in the area of dementia.

Anyone can submit resources to the new platform. A comprehensive review process is undertaken for each new resource submitted before it is posted online to ensure that these meet quality and good practice criteria. Reviewers are dementia experts, people with lived experience of dementia and members of the WHO Secretariat.

Users can search resources by country, region or language, and narrow down their searches by type of resources. Users of the platform are also invited to leave comments and rate resources to further enhance discussion about ways to promote and strengthen dementia practice.

- Access the Global Dementia Observatory Knowledge Exchange Platform here: <https://globaldementia.org> 

## Experts call for comprehensive reform of miscarriage care and treatment worldwide

A three-paper report published in *The Lancet* highlights that the current approach to miscarriage care must be improved, by providing more accurate diagnosis and appropriate investigations, improved treatments to prevent miscarriage, effective management methods that suit

women’s needs and preferences, and treatment from health-care professionals specifically trained in early pregnancy care. The authors also note that there is an urgent need to offer psychological support for affected women and their partners.

The Lancet Series on Miscarriage highlights that clinical practice for recurrent miscarriage is inconsistent and poorly organised worldwide. Women who have had recurrent miscarriages often need to attend many clinics in their search for a cause and remedy for miscarriage, as they are rarely able to access all tests and treatments in one clinic. This means they are treated by multiple healthcare professionals, who frequently give conflicting advice due to variation in practice and guidelines, adding to women’s distress as they try to understand their loss.

Co-lead author of the report, Professor Siobhan Quenby from the University of Warwick and the Deputy Director of Tommy’s National Centre for Miscarriage Research, UK, says: “Many women have concerns over the unsympathetic care they receive following a miscarriage – with some not being offered any explanation, and the only advice they receive being to try again. This is not good enough, and we must ensure women are properly supported.”

She explains: “Although miscarriage is a one-time occurrence for most women, a significant portion of the population will require treatment and support. Yet silence around miscarriage remains not only for women who experience miscarriage but also among healthcare providers, policymakers, and research funders. We urge all countries to develop and provide more comprehensive miscarriage care services based on our recommendations, as well as improving research into miscarriage prevention, identifying women at high risk of physical and psychological after-effects, and screening for mental health issues after pregnancy loss.”

A Lancet editorial published alongside the report states: “For too long miscarriage has been minimised and often dismissed. The lack of medical progress should be



shocking. Instead, there is a pervasive acceptance. Not all miscarriages could be avoided, but the insidious implication that miscarriage, like other women's reproductive health issues, including menstrual pain and menopause, should be managed with minimal medical intervention is ideological, not evidence based. This Series should catalyse a major focus on miscarriage for the medical research community, for service providers, and for policy makers. The era of telling women to 'just try again' is over."

In addition to insufficient care and support, there is debate over the definition of recurrent miscarriage, its causes, and its effects. The new report aims to create consensus by summarising the best available evidence to provide up-to-date estimates of the prevalence and risk factors for miscarriage, the physical, psychological, and economic costs of early pregnancy loss, as well as providing recommendations to improve care for miscarriage. The report is an effort from 31 international authors whose expertise spans miscarriage treatment and care, epidemiology, health economics, laboratory science, clinical trials, and patient advocacy.

• Access *The Lancet* series of reports on miscarriage here: [www.thelancet.com/series/miscarriage](http://www.thelancet.com/series/miscarriage) MBH

## WHO appoints first members to Council on the Economics of Health for All

The World Health Organization has convened 11 leading figures in economics, health and development from around the world as the first members of the WHO Council on the Economics of Health for All. The Council's role is to provide independent advice to the Director-General on addressing interrelated health and economic challenges and mapping out a way forward that supports communities and countries to build healthy societies. To do so, it will provide

recommendations for a new approach to shape the economy that supports health for all as an overall goal, including more equitable and effective health systems.

"I am delighted that WHO is convening this talented and driven group of global experts as the WHO Council on the Economics of Health for All, which is Chaired by the distinguished economist Professor Mariana Mazzucato," said Dr Tedros Adhanom Ghebreyesus, WHO Director-General. "I established this Council precisely to gather leading experts in economics, policy development and health, and to benefit from their knowledge and skill. I urge them to advise on a new way forward that ensures health is at the heart of all government action and investment decisions. We must value and invest in health as our most important commodity."

The WHO Council aims to reframe health for all, as a global objective, and ensure that national and global economies and finance are structured in such a way to deliver on this ambitious goal. This includes advice on what can be done and practical tools in four important areas: new ways to measure and value health for all, build up public sector capacity to drive transformative change and innovate towards achieving population health goals, and, to ensure financial systems invest in creating health. This requires a transformation in financing for health, not as a cost but a long-term investment for a "healthy society", grounded in the fundamental truth that health and the economy are interdependent.

Patron of the Council, Sanna Marin, Prime Minister of Finland, said the new body will provide strong support to WHO and countries in addressing the interconnected issues of public health and the economy.

Prime Minister Marin said: "The pandemic has had a momentous impact on health, economies and societies around the world. At the same time,



Patron of the Council, Sanna Marin, Prime Minister of Finland

it has shown that, with the right approach, it is possible to protect the vulnerable, to safeguard both health and the economy. It has underlined the meaning of global solidarity and the importance of putting people at the centre of decision-making. The participation of women in the policy design and at the heart of response and recovery is essential."

She added: "We strongly believe that this Council will provide invaluable advice to both to the Secretariat and the Member States."

In addition to Professor Mariana Mazzucato, as Chair, the inaugural members of the council are Professor Senait Fisseha, Professor Jayati Ghosh, Vanessa Huang, Professor Stephanie Kelton, Professor Ilona Kickbusch, Linah Kelebogile Mohohlo, Dr Zélia Maria Profeta da Luz, Kate Raworth and Dame Marilyn Waring. Additional members may be appointed. Dr Vera Songwe will join as a special guest.

"The COVID-19 pandemic has shone the brightest light ever on the great lack of capacity and alignment among essential sectors in society in how they respond to the interlinked health and economic challenges people face in their daily lives," said Professor Mazzucato, Council Chair, Professor of the Economics of Innovation and Public Value and Founding Director in the Institute for Innovation and Public Purpose at University College London. "Government capacities for protecting public health and, in turn, safeguarding and boosting economies require interlinked strategies, investment and political commitment. Health for all must be at the heart of government investment and innovation decisions – and it must be governed with the common good in mind. The Council will work to address these many challenges and offer the world a path forward." MBH

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OUR COMPANY PROFILE

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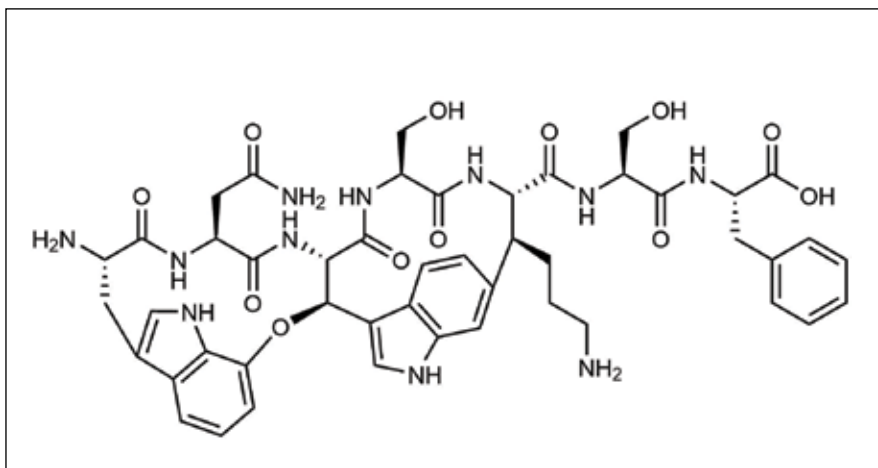
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Bottles



# the laboratory

Medical research news from around the world



Darobactin structure

## Newly discovered Darobactin could be much-hoped-for novel antibiotic

Most antibiotics need to penetrate their target bacteria. But Darobactin, a newly discovered compound, is much too large to do so. Nonetheless, it kills many antibiotic-resistant pathogens – by exploiting a tiny weak spot on their surface. Basel researchers have now revealed the mechanism at play and thereby opened the door to developing completely new medicines.

An increasing number of bacterial pathogens are resistant to antibiotics. And the most dangerous pathogens share a common feature: a double membrane that is difficult to penetrate. Even when antibiotic agents are able to break into this shell, the bacteria just pump them right out again. But a recently discovered compound called Darobactin manages to circumvent these protective measures and kill nearly all problem pathogens. Researchers have now been able to elucidate the mechanism of action in a project funded by the Swiss National Science Foundation (SNSF) under the National Research Programme “Antimicrobial Resistance” (NRP 72).

### Like a broken key

In a study published in *Nature* [1], the researchers describe how a deceptive ma-

noeuve enables Darobactin to work: its shape mimics a special three-dimensional structure normally found only in proteins produced by bacteria as building blocks for their outer membrane. The structure is the “key” for inserting the proteins into the outer shell at specific locations. Darobactin is a copy of this key. However, it does not act to penetrate the bacteria, but merely blocks the keyhole from the outside – like locking a door and then breaking off the key. As a result, the transport route for the bacteria’s shell components is obstructed and they die.

### Hard to detect by conventional means

Similar mechanisms are already known in microbiology and are used by other drugs. The targeted binding structures, or keyholes, are usually quite large – at least in microbiological terms. In contrast, the target inhibited by Darobactin is very small and cannot be detected by conventional methods. At the same time, Darobactin is larger than most drugs and cannot get through the entry ports of the bacteria.

“At the beginning, we were puzzled by this,” say Sebastian Hiller and Timm Maier of the Biozentrum of the University of Basel, the two principal authors of the study.


Their teams immediately realised that Darobactin does not act inside the pathogens but rather on the surface. There it interferes with the function of a protein known as BamA, which plays a central role in the construction of the double-protective membrane. “But how exactly Darobactin interacts with BamA was completely unclear,” says Hiller. It was only by combining several methods that the researchers finally identified the mechanism of action.

### Spotting the perfect weak point

They discovered that Darobactin attacks a true Achilles heel of the pathogens: it binds directly to the most important site of BamA, the so-called backbone atoms. Because these atoms hold the protein together and determine its shape, it is nearly impossible to change them – though changing them would be the usual way for the bacteria to fend off a new antibiotic. In fact, Darobactin retained its effectiveness against all pathogens, for which Hiller and his team conducted laboratory tests that simulate resistance. In other words, the pathogens failed to change the broken lock.

### Targeted drug development

These findings are a decisive step towards medical application, says infection biologist Dirk Bumann, who also conducts research at the Biozentrum in Basel. As co-director of the National Centre of Competence in Research (NCCR) “AntiResist”, which like NRP 72 is funded by the SNSF, he closely follows activities in antibiotics research. “Identifying Darobactin’s mechanism of action is a major achievement,” he says, “because it will enable further targeted improvement of Darobactin and its development into an effective drug”. That gives a boost to the long-cherished hope of finding a new generation of antibiotics to fight many of today’s problem pathogens.

- [1] The antibiotic darobactin mimics a  $\beta$ -strand to inhibit outer membrane insertase. *Nature* (2021). <https://dx.doi.org/10.1038/s41586-021-03455-w> 



## 13 new Alzheimer's genes identified in first-of-its-kind human genome study

In the first study to use whole genome sequencing (WGS) to discover rare genomic variants associated with Alzheimer's disease (AD), researchers have identified 13 such variants (or mutations). In another novel finding, this study establishes new genetic links between AD and the function of synapses and neuroplasticity, or the ability of neurons to reorganize the brain's neural network. These discoveries could help guide development of new therapies for this devastating neurological condition.

Researchers at Massachusetts General Hospital (MGH), the Harvard T. H. Chan School of Public Health, and Beth Israel Deaconess Medical Center report these findings in *Alzheimer's & Dementia: The Journal of the Alzheimer's Association*.

Over the last four decades, MGH has pioneered research on the genetic origins of AD, led by Rudolph Tanzi, PhD, vice chair of Neurology and director of the hospital's Genetics and Aging Research Unit. Notably, Tanzi and colleagues co-discovered genes that cause early onset (prior to age 60) familial AD, including the amyloid protein (A4) precursor (APP), and the presenilin genes (PSEN1 and PSEN2). Mutations in these genes lead to accumulation of amyloid plaques in the brain, a hallmark of AD.

The next 30 AD gene variants that were discovered are primarily linked to chronic inflammation in the brain (or neuroinflammation), which also increases the risk for this cognitive disease. However, loss of synapses is the neurological change that is most closely correlated with the severity of dementia in Alzheimer's disease, yet no clear genetic links between the disease and these vital connections had previously been identified. "It was always kind of surprising that whole-genome screens had not identified Alzheimer's genes that are directly involved with synapses and neuroplasticity," says Tanzi.

Prior to this paper, the genome-wide association study (GWAS) was the primary tool used for identifying AD genes.

In a GWAS, the genomes of many individuals are scanned in search of common gene variants that occur more frequently in people who have a given disease, such as AD. But to date, common Alzheimer's-associated gene variants have accounted for less than half of the heritability of AD. A standard GWAS misses the rare gene variants (those occurring in less than 1% of the population), a problem solved by the WGS, which scans every bit of DNA in a genome.

"This paper brings us to the next stage of disease-gene discovery by allowing us to look at the entire sequence of the human genome and assess the rare genomic variants, which we couldn't do before," says Dmitry Prokopenko, PhD, of MGH's McCance Center for Brain Health, who is lead author of the study.

Identifying less-common gene mutations that increase the risk for AD is important because they may hold critical information about the biology of the disease, says Tanzi. "Rare gene variants are the dark matter of the human genome," he says, and there are lots of them: Of the three billion pairs of nucleotide bases that form a complete set of DNA, each person has 50 to 60 million gene variants – and 77% are rare.

In their quest to find rare AD gene variants, Tanzi, Prokopenko and their colleagues performed WGS analyses on the genomes of 2,247 individuals from 605 families that include multiple members who have been diagnosed with AD. They also analysed WGS datasets on 1,669 unrelated individuals. The study identified 13 previously unknown rare gene variants associated with AD. Strikingly, these gene variants were associated with functioning of synapses, development of neurons, and neuroplasticity.

"With this study, we believe we have created a new template for going beyond standard GWAS and association of disease with common genome variants, in which you miss much of the genetic landscape of the disease," says Tanzi, who sees

potential for their methods to be used to study the genetics of many other conditions. Moreover, he plans to use "Alzheimer's in a dish" – three-dimensional cell culture models and brain organoids he and his colleagues have developed over the past decade – to explore what happens when the rare mutations this paper identified are inserted in neurons. "That could help guide us in novel drug discovery," says Tanzi. MEH

## Researchers develop novel form of fast, precise histopathology using holographics

A recent advance in histopathology eliminates the need for chemical staining and enables high-resolution imaging of thick tissue sections. Traditional methods in histopathology are generally limited to thin specimens and require chemical processing of the tissue to provide sufficiently high contrast for imaging, which slows the process. As reported in *Advanced Photonics*, an international research team recently demonstrated a 3D label-free quantitative phase imaging technique that uses optical diffraction tomography to obtain volumetric imaging information. Automated stitching simplifies the image acquisition and analysis.

Optical diffraction tomography is a microscopy technique for reconstructing the refractive index of a tissue sample from its scattered field images obtained with various illumination angles. It enables label-free high contrast visualization of transparent samples. The complex scattered field transmitted through the sample is first retrieved using off-axis holography, then the scattered fields obtained with various angle of illuminations are mapped in the Fourier space enabling the reconstruction of the sample refractive index.

A recognized limitation of optical diffraction tomography is due to the com-






plex distribution of refractive indexes, which results in significant optical aberration in the imaging of thick tissue. To overcome this limitation, the team used digital refocusing and automated stitching, enabling volumetric imaging of 100- $\mu$ m-thick tissues over a lateral field of view of 2 mm  $\times$  1.75 mm while maintaining a high resolution of 170 nm  $\times$  170 nm  $\times$  1400 nm. They demonstrated that simultaneous visualization of subcellular and mesoscopic structures in different tissues is enabled by high resolution combined with a wide field of view.

The researchers demonstrated the capacity of their novel method by imaging a variety of different cancer pathologies: pancreatic neuroendocrine tumour, intraepithelial neoplasia, and intraductal papillary neoplasm of bile duct. They imaged millimetre-scale, unstained, 100- $\mu$ m-thick tissues at a subcellular 3D resolution, which enabled the visualization of individual cells and multicellular tissue architectures, comparable to images obtained with traditional chemically processed tissues.

According to YongKuen Park, researcher at the Korea Advanced Institute of Science and Technology and senior author on the study: “The images obtained with the proposed method enabled clear visualization of different morphological features in the various tissues allowing for recognition and diagnosis of precursor lesions and pathologies.”

Park notes that further research is needed, but the results suggest great potential for fast, accurate histopathology during surgery: “More research is needed on sample preparation, reconstruction speed, and mitigation of multiple scattering. We expect optical diffraction tomography to provide faster and more precise diagnostics in histopathology and intraoperative pathology consultations.”

- Read the open access article by Herve Hugonnet et al. Multiscale label-free volumetric holographic histopathology of thick-tissue slides with subcellular resolution. *Advanced Photonics*, doi: <https://doi.org/10.1117/1.AP.3.2.026004> 

## Nurses’ physical, mental health connected to preventable medical errors

A study led by The Ohio State University College of Nursing finds that critical care nurses in poor physical and mental health reported significantly more medical errors than nurses in better health.

The study, which was conducted before the COVID-19 pandemic, also found that “nurses who perceived that their worksite was very supportive of their well-being were twice as likely to have better physical health.”

Study findings published May 1, 2021 in the *American Journal of Critical Care*.

“It’s critically important that we understand some of the root causes that lead to those errors and do everything we can to prevent them,” lead author Bernadette Melnyk said. She serves as vice president for health promotion, chief wellness officer and dean of the College of Nursing at Ohio State.

The authors quoted research on the prevalence of stress, anxiety, depression and burnout symptoms among critical care nurses as a basis for examining the potential correlation between well-being and medical errors. The study surveyed nearly 800 members of the American Association of Critical-Care Nurses.

“It’s clear that critical care nurses, like so many other clinicians, cannot continue to pour from an empty cup,” Melnyk said. “System problems that contribute to burnout and poor health need to be fixed. Nurses need support and investment in evidence-based programming and resources that enhance their well-being and equip them with resiliency so they can take optimal care of patients.”

Study findings included:

- Of those surveyed, 61% reported suboptimal physical health, while 51% reported suboptimal mental health.
- Approximately 40% screened positive for depressive symptoms and more than 50% screened positive for anxiety.




- Those who reported worse health and well-being had between a 31% to 62% higher likelihood of making medical errors.

- Nurses who reported working in places that provided greater support for wellness were more than twice as likely to have better personal health and professional quality of life compared with those whose workplace provided little or no support.

The Ohio State Wexner Medical Center has several programmes to promote clinician well-being, including its Employee Assistance Program which offers confidential mental health resources and services such as counselling, mindfulness coaching and its Stress, Trauma and Resilience (STAR) Program that offers the Buckeye Paws pet therapy programme to promote building coping and resiliency skills.

The authors mention that levels of stress, anxiety and depression are likely even higher in the current environment than before the pandemic, when the study was conducted.

“The major implication of this study’s findings for hospital leaders and policy makers is that critical care nurses whose well-being is supported by their organizations are more likely to be fully engaged in patient care and make fewer medical errors, resulting in better patient outcomes and more lives saved,” the researchers wrote. 

# Speech Recognition in Healthcare

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## Study finds past COVID-19 infection does not fully protect young people against reinfection

A past COVID-19 infection does not completely protect against reinfection in young people, according to an observational study of more than 3,000 healthy members of the US Marines Corps most of whom were aged 18-20 years, published in *The Lancet Respiratory Medicine* journal.

The authors say that despite previous infection and the presence of antibodies, vaccination is still necessary to boost immune responses, prevent reinfection, reduce transmission, and that young people should take up the vaccine wherever possible.

In the study, between May and November 2020, around 10% (19 out of 189) of participants who were previously infected with SARS-CoV-2 (seropositive) became reinfected, compared with new infections in 50% (1,079 out of 2,247) of participants who had not previously been infected (seronegative).

Although the study was in young, fit, mostly male Marine recruits, the authors believe that the risk of reinfection found in their study will apply to many young people, but that the exact rates of reinfections will not be applicable elsewhere (owing to the crowded living conditions on a military base and close personal contact required for basic training likely contributing to a higher overall infection rate than seen elsewhere). For example, a study of 4 million people in Denmark also found that the risk of infection was five times higher in people who had not before had COVID-19, but they found that only 0.65% of people who had COVID-19 during Denmark's first wave tested positive again during the second wave, compared with 3.3% of people who tested positive after initially being negative [1]. In addition, a preprint study including British healthcare workers found that those who had been not previously infected had a five times higher risk

of being reinfected than people who had a past infection<sup>[2]</sup>.

Professor Stuart Sealfon, of Icahn School of Medicine at Mount Sinai, USA, and senior author of the study, says: "As vaccine roll outs continue to gain momentum it is important to remember that, despite a prior COVID-19 infection, young people can catch the virus again and may still transmit it to others. Immunity is not guaranteed by past infection, and vaccinations that provide additional protection are still needed for those who have had COVID-19."

In the study, US Marine Corps recruits completed an unsupervised quarantine at home for two weeks before entering a Marine-supervised quarantine facility for another two weeks. They received antibody tests to establish whether any of the recruits were seropositive (they had previously been infected with SARS-CoV-2 and had antibodies). They were also tested for new SARS-CoV-2 infection at baseline then weeks one and two of the quarantine, and completed a questionnaire including demographic information, risk factors, medical history, and COVID-19 symptoms. Participants were excluded from the study if they tested positive for COVID-19 via PCR test during their supervised quarantine. After quarantine, recruits who did not have COVID-19 entered basic training and were tested for new SARS-CoV-2 infection by PCR tests every two weeks, for six weeks and completed follow up questionnaires about any COVID-19 symptoms.

Recruits who tested positive for a new second COVID-19 infection during the study were isolated and the study team followed up with additional testing. Levels of neutralising antibodies were also taken from subsequently infected seropositive and selected seropositive participants who were

not reinfected during the study period.

Of the 2,346 Marines followed long enough for this analysis of reinfection rate, 189 were seropositive and 2,247 were seronegative at the start of the study. Across both groups of recruits, there were 1,098 (45%) new infections during the study. Among the seropositive participants, 19 (10%) tested positive for a second infection during the study. Of the recruits who were seronegative, 1,079 (48%) became infected during the study.

### Why did reinfections occur?

To understand why these reinfections occurred, the authors studied the reinfected and not infected participants' antibody responses. They found that, among the seropositive group, participants who became reinfected had lower antibody levels against the SARS-CoV-2 virus than those who did not become reinfected. In addition, in the seropositive group, neutralising antibodies were less common (neutralising antibodies were detected in 45 (83%) of 54 uninfected, and in six (32%) of 19 reinfected participants during the six weeks of observation).

Comparing new infections between seropositive and seronegative participants, the authors found that viral load (the amount of measurable SARS-CoV-2 virus) in reinfected seropositive recruits was on average only 10 times lower than in infected seronegative participants, which could mean that some reinfected individuals could still have a capacity to transmit infection, but the authors note that this will need further investigation.

In the study, most new COVID-19 cases were asymptomatic – 84% (16 out of 19 participants) in the seropositive group vs 68% (732 out of 1,079 participants) in the seronegative group – or had mild symp-



toms, and none were hospitalised.

The authors note some limitations to their study, including that it likely underestimates the risk of reinfection in previously infected individuals because it does not account for people with very low antibody levels following their past infection (in the study there were an unknown number of people in the seronegative group who had previously been infected but who did not have detectable levels of antibodies in their baseline antibody level test).

Writing in a linked comment, María Velasco of Hospital Universitario Fundación Alcorcón, Spain, said: “This study was conducted in a closed setting but provides some interesting insights regarding the risk of subsequent SARS-CoV-2 infection in the general population or other settings. First, the rate of new SARS-CoV-2 PCR positive results is about 80% lower among seropositive individuals. These data confirm that seropositive individuals have a significant albeit limited protection for new infections [...] Second, the rate of new SARS-CoV-2 PCR detection among seropositive Marines cases is not negligible (1•1 cases per person-year), even in the young and healthy population. Globally, these results indicate that COVID-19 does not provide an almost universal and long-lasting protective immunity such as measles.”

She continued: “Efforts must be made to reduce the risk of SARS-CoV-2 transmission from young oligosymptomatic individuals. Results from Letizia et al. suggest that even young individuals with a previous SARS-CoV-2 infection should also be a target of vaccination to avoid a poorly noticed source of transmission.”

• Access the research paper: SARS-CoV-2 seropositivity and subsequent infection risk in healthy young adults: a prospective cohort study. The Lancet Respiratory Medicine.

doi: [https://doi.org/10.1016/S2213-2600\(21\)00158-2](https://doi.org/10.1016/S2213-2600(21)00158-2)

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[1] [https://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(21\)00575-4/fulltext](https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(21)00575-4/fulltext)

[2] <https://www.medrxiv.org/content/10.1101/2021.01.13.21249642v1>

## Babies born to mothers with COVID-19 have low risk of infection

Researchers at Karolinska Institutet and the Public Health Agency of Sweden have studied newborn babies whose mothers tested positive for SARS-CoV-2 during pregnancy or childbirth. The results show that although babies born of test-positive mothers are more likely to be born early, extremely few were infected with COVID-19. The study, which is published in the journal *JAMA*, supports the Swedish recommendation not to separate mother and baby after delivery.

The population-based study comprised 92 per cent of all neonates – almost 90,000 births – in Sweden during the first year of the pandemic (11 March 2020 to 31 January 2021), making it one of the largest datasets in the field to date.

The results show a slightly higher level of morbidity in neonates whose mothers tested positive for SARS-CoV-2, including an increased risk of respiratory disorders, which were largely due to the higher number of preterm births in this group. No direct correlation between maternal infection and neonatal respiratory infection or pneumonia could be observed.

A total of 2,323 babies were born to SARS-CoV-2-positive mothers, of whom about one third were tested close to or just after childbirth. Only 21 (0.9 per cent) of the babies of these women tested positive for the virus at some point during the newborn period (the first 28 days), the majority without displaying any symptoms; a few babies were treated for other reasons than COVID-19.

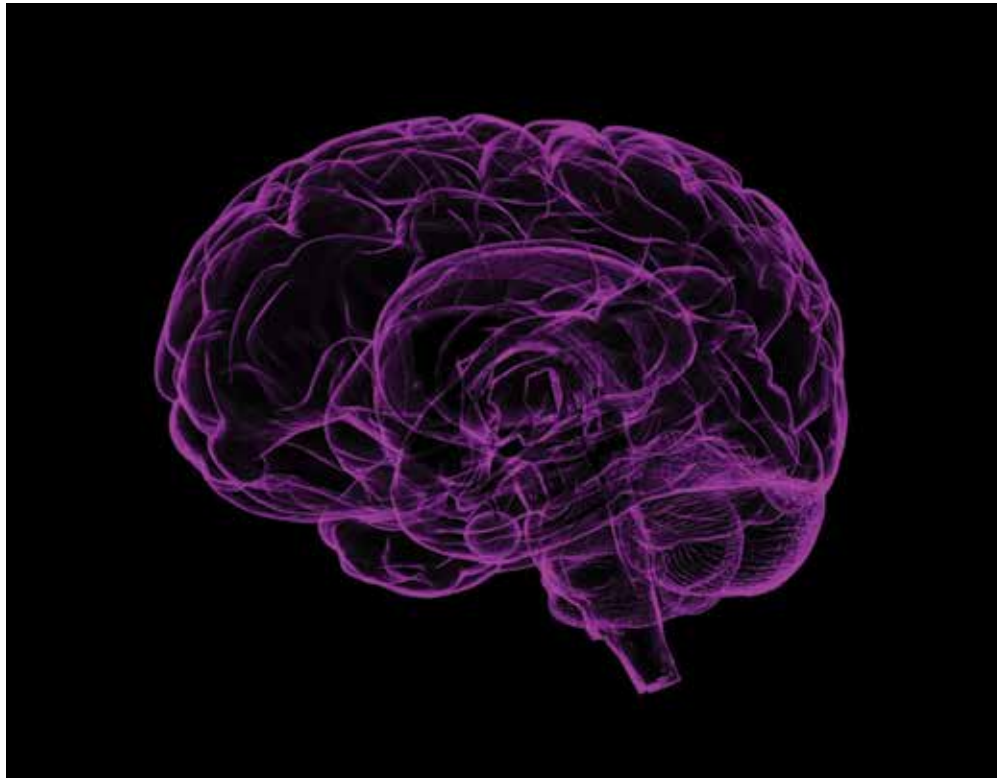
The study supports the Swedish recommendation that babies born of women who have tested positive for SARS-CoV-2 while pregnant or during delivery do not need to be routinely separated from their mothers at birth. In many countries such a precautionary measure is taken despite the lack of supporting evidence.

“Separating a newborn baby from its mother is a serious intervention with negative consequences for the health of both mother and baby that must be weighed against the possible benefits,” says Mikael Norman, professor of paediatrics at the Department of Clinical Science, Intervention and Technology, Karolinska Institutet, and one of the researchers leading the study. “Our study suggests that mother and baby can be cared for together and that nursing can be recommended without danger to the baby’s health. This is good news for all pregnant women, their babies and postnatal and neonatal staff.”

“By cross-referencing the three registries we’ve been able to monitor and report outcomes for the neonates in real time during both the first and second waves of COVID-19,” says Professor Norman.

#### Reference

Association of Maternal SARS-CoV-2 Infection in Pregnancy With Neonatal Outcomes. *JAMA*, online 29 April 2021, doi: [www.doi.org/10.1001/jama.2021.5775](https://doi.org/10.1001/jama.2021.5775)



# American Heart Association outlines steps to reduce risk of stroke during, after heart surgery

Steps for reducing the risk of stroke in patients undergoing heart surgery are detailed in a new American Heart Association Scientific Statement, “Considerations for Reduction of Risk of Perioperative Stroke for Adult Patients Undergoing Cardiac and Thoracic Aortic Operations,” published in the American Heart Association’s flagship journal *Circulation*. Pre-screening, surgical technique changes, early diagnosis while in surgery and quick team response all contribute to better survival rates and reduce the risks of major disability for patients.

“Cardiac surgery has come a long way in recent decades, and improvements in pre-operative screening and treatment now really make a difference between a patient suffering a disabling stroke or surviving

and thriving with a good quality of life,” said Mario F.L. Gaudino, M.D., chair of the writing group for the scientific statement, and a cardiac surgeon and professor of cardiothoracic surgery at New York-Presbyterian and Weill Cornell Medicine in New York City. “This statement provides an overview of the latest surgical protocols and techniques that can reduce stroke risk after heart surgery and improve patient survival and outcomes.”

A stroke that happens during or soon after heart surgery is called a perioperative stroke. Patients undergoing heart surgery who experience perioperative stroke have a 5 to 10 times higher risk of in-hospital death, increased costs and length of hospital stay, and increased risk of cognitive

decline one year after surgery. The statement cites stroke as the most feared complication of cardiac surgery – most patients would sacrifice longevity for freedom from stroke.

Stroke risk for common cardiac procedures varies depending on both patient risk factors and the procedure. The risk is about 1% for a valve repair or coronary artery bypass alone; 2-3% if those procedures are combined; and 3-9% for surgeries involving the aorta. Stroke risk is also higher for the 27% to 40% of patients who develop atrial fibrillation after heart surgery.

Typical pre-surgery screening for perioperative stroke risk includes an assessment of age, high blood pressure, high cholesterol, Type 2 diabetes, smoking, heart failure,



renal disease, atrial fibrillation and prior history of stroke or transient ischemic attack. The scientific statement further suggests monitoring and actions to diagnose and treat a surgery-related stroke quickly.

Highlights of the statement's recommendations are:

#### Prevention during surgery

- Monitor blood flow to the brain;
- Intraoperative imaging of the aorta;
- Tight blood pressure control; and
- Closely monitor blood loss and the need for transfusion.

#### Early stroke diagnosis

- Perform a complete neurologic exam as soon as possible after surgery;
- If a patient is high-risk for perioperative stroke, consider a fast-track anaesthesia protocol to help quickly identify signs of a stroke after surgery;
- Have a stroke team in place to provide emergency treatment if a stroke is suspected; and
- Conduct a head CT and CT angiography of head and neck as soon as stroke is suspected.

#### Rapid treatment of perioperative stroke

- Transfer the patient to intensive care;
- Optimize brain oxygenation and perfusion;
- Consider clot busting or clot removal therapy; and
- Evaluate patient's speech and swallow function; evaluate for rehabilitation; screen for depression; and begin preventive therapy for deep vein thrombosis.

"It's imperative that a stroke team work together to assess a patient's health before, during and after heart surgery. In addition to the surgeons, this multidisciplinary team should include stroke neurologists, neuro-interventionalists, neurocritical care specialists and neuro-anaesthesiologists," added Dr Gaudino. "Following these protocols can lead to quicker response times by medical teams in the event of an emergency and help to reduce the frequency of neurological injuries among patients."

• doi: <http://dx.doi.org/10.1161/CIR.0000000000000885>

# Long-term follow-up study shows no increase in colorectal cancer risk after obesity surgery

Obesity is a known risk factor for several types of cancer, including colorectal cancer (affecting the colon or rectum). It is already established that bariatric surgery leads to a decrease in overall cancer risk in patients with obesity.

However, some studies on colorectal cancer have shown an elevated cancer risk after bariatric surgery, while others have reported a risk reduction. These conflicting results have raised concerns about this surgery and highlighted the need for more long-term studies analysing the effect of bariatric surgery on colorectal cancer risk.

The current study, published in PLOS ONE, is based on data from the SOS (Swedish Obese Subjects) study, which began in 1987 and is led and coordinated from the Sahlgrenska Academy, University of Gothenburg, as well as data from the Swedish Cancer Register, kept by the National Board of Health and Welfare.

#### More than 20 years' follow-up

The scientists studied a group of 4047 individuals with obesity; 2,007 underwent bariatric surgery (surgery group) and 2,040 individuals received non-surgical obesity treatment (control group). The groups were comparable in terms of sex, age, body composition, risk factors for cardiovascular disease, psychosocial variables, and personality traits.

The median follow-up period of the study exceeded 22 years. Over this time, the surgery group underwent a significant weight loss, while the controls broadly retained their original weight. During the follow-up period, there were 57 cases of colorectal cancer in the surgery group and 67 in the control group.

#### High clinical relevance

"In this very long-term study, we could



Magdalena Taube, associate professor at the department of Molecular and Clinical Medicine at Sahlgrenska Academy, University of Gothenburg.

not verify that bariatric surgery is associated with changes in colorectal cancer risk in patients with obesity. This result is of high clinical relevance," said Magdalena Taube, associate professor at the department of Molecular and Clinical Medicine at Sahlgrenska Academy and the lead author of the study.

The SOS study is the only prospective, controlled study in the world that examines the very long-term effects of obesity surgery compared with conventional obesity treatment. This very long-term follow-up has been crucial for the conclusion of this study: the risk of colorectal cancer does not increase after bariatric surgery.

"Bariatric surgery leads to a substantial weight loss and better health in most patients, but it's still important to keep up healthy living habits and go for regular check-ups after the operation too," Taube said.

• doi: <https://doi.org/10.1371/journal.pone.0248550>

# Artificial Intelligence used to enhance decision making during colorectal cancer surgery for first time

A clinical research study published in the *British Journal of Surgery* shows that fluorescence guidance can enable a colorectal surgeon to assess cancer tissues visually and with more specificity in real-time during surgery, by utilising near-infrared (NIR) light from an administered fluorophore in conjunction with artificial intelligence (AI) methods.

In this study, supported by the Disruptive Technologies and Innovation Fund 2018, videos from 24 patient (11 with cancer) surgeries were studied. Numerous ROIs (Regions of Interest) from each area of abnormality were selected for analysis from each video. NIR intensities were extracted by tracking the ROIs within each video, focusing on the initial wash-in period. The data set used for analysis included 435 ROI profiles each with 12 perfusion-characterising features with balanced outcomes. At patient level, the system correctly diagnosed 19 of 20 cancers (95%.)

Speaking about the study, Prof Ronan Cahill, Professor of Surgery at University College Dublin (UCD) and the Mater Misericordiae University Hospital (MMUH) said: “Surgery has the substantial role to play in the therapy of over two-thirds of all cancers and key surgical decisions are traditionally made by human visual judgements, which assume a static biological FOV (Field of View) during the time frame of the observation.

“The process for uptake and release of an external substance, such as drugs and contrast agents, are unique in cancerous tissues. As such, we envisaged that an approach combining biophysics-inspired modelling and AI could analyse intraoperative changes in NIR intensities over time in varied tissue, enabling clinically useful lesion classification with high specificity. To translate this knowledge for the first

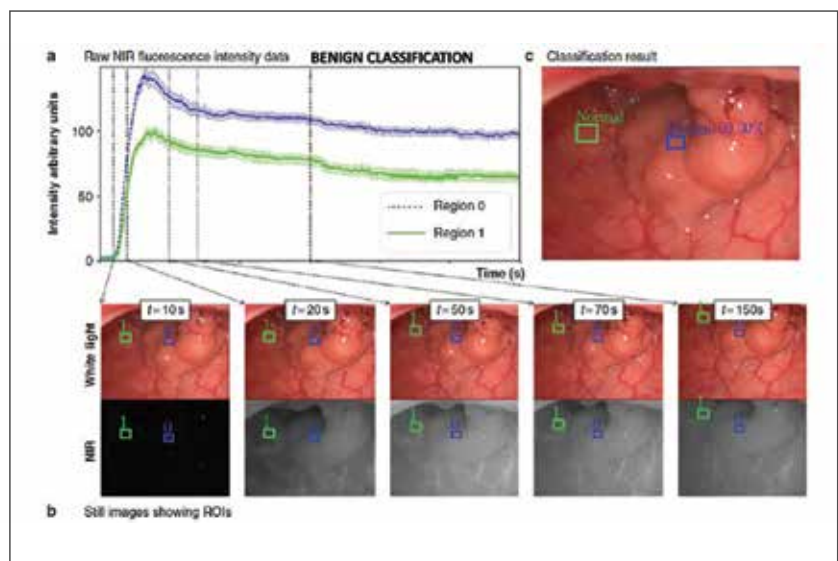
time into an intraoperative surgical decision support tool, a computer vision-AI real time tissue-tracking and categorising prototype has been developed. As the prototype relies only on the NIR fluorescence data stream, it is usable with commercially available imaging systems.”

Commenting on the study, Professor Donal O’Shea, Department of Chemistry at RCSI University of Medicine and Health Sciences, said: “Targeted agents for cancer imaging currently under trial adhere rigidly to conventional paradigms of fluorescence guided surgery mechanisms, and in the main are administered systemically before surgery, with the operation scheduled for when maximum stable contrast between the tumour and other tissues exist. However this timing is often unpredictable, it can take some days and false positives can occur. Clinical usefulness is further limited by dosing practicali-

ties, scheduling challenges and patient-to-patient and cancer-to-cancer differences. This work instead indicates a novel pathway and process for immediate, perfect realisation of agent information during surgery which would greatly improve efficiency and effectiveness of cancer care”

This early experiential report describes the achievement of this real time decision support tool for the first time. Furthermore:

- the findings are relevant to other cancers and metastases and indeed to other dyes used in cancer surgery
  - next stages of work include expanding the tissue classification from operator-selected ROIs to the entire FOV
  - additional patient-specific surgery-guided information are envisaged including an AI heat-map display of the classification results to the surgical team along with further fluorescence data-mining via AI.
- doi: <https://doi.org/10.1093/bjs/znaa004>



NIR intensities were extracted by tracking ROIs within each video, focusing on the initial ICG wash-in period of 100-300 s





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## Study shows surgery should remain as mainstay of treatment for acute uncomplicated appendicitis

An RCSI study conducted in Beaumont Hospital in Dublin has found that surgery, rather than antibiotics-only, should remain as the mainstay of treatment for acute uncomplicated appendicitis.

Published in the *Annals of Surgery* and led by researchers from the RCSI University of Medicine and Health Sciences, the study entitled the COMMA trial (Conservative versus Open Management of Acute uncomplicated Appendicitis) examined the efficacy and quality of life associated with antibiotic-only treatment of acute uncomplicated appendicitis versus surgical intervention. The results revealed that antibiotic-only treatment resulted in high recurrence rates and an inferior quality of life for patients.

Acute uncomplicated appendicitis is a commonly encountered acute surgical condition. Traditional management of the condition has involved appendectomy. Antibiotic-only treatment has emerged as a potential alternative option that could offer benefits to patients and hospitals, such as a faster recovery, less scarring, less pain, a better quality of life for patients and reduced demand on operating theatres. There has been a reluctance to adopt antibiotic-only treatment due to previous research that has shown wide variability in failure rates and a lack of evidence regarding the impact on

quality of life for patients.

In this research, 186 patients with radiological evidence of acute, uncomplicated appendicitis were randomised to two groups. One group received antibiotic-only treatment and patients in the other group were treated with surgery. Patients in the surgery group underwent a laparoscopic appendectomy. In those treated with antibiotics-only, intravenous antibiotics were administered until there was an improvement in a patient's signs and symptoms and this was followed by five days of oral antibiotics.

In the weeks and months following treatment, patients were followed up with questionnaires including a quality of life questionnaire at 1 week, 1 month, 3 months and 12 months. At these points, the patient's pain score, need for additional sick leave, surgical site infections and the development of recurrent appendicitis were recorded.

The results from the antibiotic-only group demonstrated that 23 patients (25%) experienced a recurrence of acute appendicitis within one year. In the quality of life questionnaires, it was found that patients in the surgery group experienced a significantly better quality of life score compared with the antibiotic-only group.

Professor Arnold Hill, Head of School of



Professor Arnold Hill

Medicine and Professor of Surgery, RCSI, said: "Antibiotic-only treatment of acute uncomplicated appendicitis has been proposed as an alternative less-invasive treatment option for patients. The COMMA Trial set out to establish if antibiotic-only treatment could replace surgery in some cases, which could offer many benefits for patients and hospitals alike. The results indicate that the treatment protocols should not change. Surgery will deliver the best outcomes for patients in terms of quality of life and recurrence and therefore should remain as the mainstay of treatment for acute uncomplicated appendicitis."

• doi: <https://doi.org/10.1097/sla.0000000000004785>

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# Leading International Orthopaedic Surgeon Provides Spine Care for Children

## Al Zahra Hospital Dubai raises the bar in paediatric orthopaedic surgical care in the Middle East

“Children are not just small adults”. This phrase is commonly used by paediatricians to explain that children are not capable of expressing the distress or discomfort they are going through. They are incapable of understanding the medical concerns and conditions that could occur or those which they are experiencing. Furthermore, children below the age of 18 require specialised medical care as their bodies and medical needs differ drastically from those of adult patients. One common specialty area that is vital to the growing needs of children is Paediatric Orthopaedics, also known as Paediatric Orthopaedic Surgery. Because children’s bodies are still growing, they have a very different joint, muscle, and bone makeup than adults and require specialized care. However, despite the abundant need for specialized orthopaedic care, this specialty is scarce amongst medical providers in the Middle East region.

With over 20 years of experience under his belt, Dr. Zaid Al Aubaidi is a rare occurrence. He is the only licensed Paediatric Spine Surgeon in the UAE and one of very few in the region. Dr. Al Aubaidi has built a prominent reputation for himself, with his practice spanning the world, from Canada to Switzerland, and China to Iraq. He holds a double Board Certification from Sweden and Denmark in Paediatric Orthopaedics and Spine Surgery. Dr. Al Aubaidi also has a North American Fellowship from Sick Kids Hospital in Canada.

It is not just Dr. Al Aubaidi’s qualifica-

tions that are remarkable but also the type and difficulty of surgeries he performs, prompting him to become an international referral point for Paediatric Orthopaedic Surgery revisions, receiving patients from all over the world including countries like Germany and the UK. Throughout his career, he has completed over 1,000 scoliosis surgeries and over 300 revision surgeries, while successfully completing some of the most complex paediatric scoliosis surgical procedures worldwide. In 2013, Dr. Al Aubaidi moved to the UAE, and is currently practicing at the Al Zahra Hospital Dubai leading the Pediatric Orthopedic Department. From preventive screenings and diagnostics to surgical care and rehabilitation, Dr. Al Aubaidi’s services cover all the essential components to guarantee positive outcomes to some of the most complex orthopaedic surgical cases.

**“It is heartbreaking for me, when people believe that surgeries abroad have better outcomes, and the children later come to us for revision surgeries. There is no guarantee in treatments, but I can guarantee that the patients will find the same international level of care with us in Dubai, if not in some cases even higher.”**

In addition, Dr. Al Aubaidi does not only focus on spine injuries or deformities, but also on several other conditions and procedures including neuromuscular disease, tendon transfers for rebalancing, trauma, musculoskeletal tumours, and correcting musculoskeletal issues derived from Cerebral Palsy or other such diseases.



Dr Zaid Al Aubaidi, Paediatric Spine Surgeon, Al Zahra Hospital Dubai

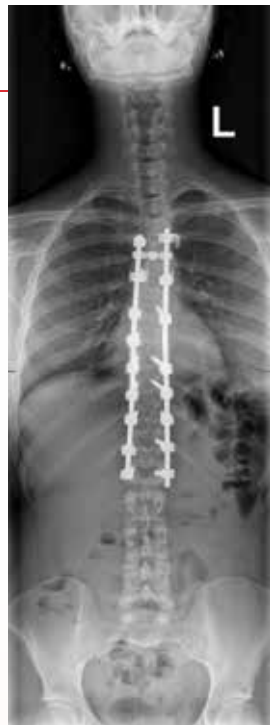
He also performs complex surgical procedures for infected joints in children.

**“It is important to be able to give these children who are either in pain or have restricted range of motion or functionality a renewed chance at life. I’ve had parents come with their children, not believing that anything can be done for them.**





Before correction of scoliosis



After correction of scoliosis



Scoliosis before brace



Scoliosis after brace

It is heartbreaking for me, when people believe that surgeries abroad have better outcomes, and the children later come to us for revision surgeries.



Tibial deformity (before treatment)



Tibial deformity (after treatment)

For all our patients, we have given them a better quality of life, if not reversed their conditions completely," Dr. Al Aubaidi explained.

#### Preventive care & non-invasive treatments

At Al Zahra Hospital Dubai, his practice is the first in the region to start hip screenings for all newborns delivered at the hospital. The hip screening is important as it leads to early detection and prevents the need for late treatments. It also prevents surgeries and leads to higher success rates. In addition, Dr. Al Aubaidi provides non-invasive treatments such as the Providence Night-Time Brace. It is a modern technology that is essentially used at night and does not interfere with the child's mobility, daily activities, or mental health. On top of that, there is evidence



that shows that the Providence Night-Time brace is an efficient treatment with satisfactory results for all curve types. Dr. Al Aubaidi also detects and treats scoliosis at an earlier stage as compared to the common practice. Doctors all over the world tend to wait for the curve of the spine in

scoliosis to reach 24 degrees and then start treatment. Dr. Al Aubaidi, on the other hand treats the curve of scoliosis when it reaches more than 10 degrees. This allows the patient to receive early treatment and to have a higher probability of avoiding surgery. **MEH**



## How Saudi Arabia's Sariryah Medical Company uses evidence-based resources from Wolters Kluwer to deliver efficient, high-quality healthcare

Evidence-based clinical support helps deliver efficient, effective care

Mohammad Dossary Hospital (MDH) is a bustling healthcare institution that provides safe, efficient, high quality care to 1,600 patients each day – more than 307,288 patients each year.

Located in the Eastern Region of Saudi Arabia, this 100-bed capacity hospital is operated by Sariryah Medical Company, which has been registered under the Saudi Ministry of Health and Commerce since 2000 and has been accredited by the Central Board for Accreditation of Healthcare Institutions (CBAHI) since 2015.

Sariryah's mission is to provide safe medical care for patients by hiring competent staff, practicing evidence-based medicine, and investing in state-of-the-art technology. To help its staff leverage the latest available best practices and research at the point of care, Sariryah invested in the Wolters Kluwer evidence-based solutions UpToDate®, Lexicomp®, and Medi-Span®. More recently, the organisation also adopted UpToDate® Advanced, an interactive clinical decision support resource.

Mr. Salem Al-Thaqafi, the Vice Chairman of Sariryah Medical Company, said: "We decided to adopt the full suite of Wolters Kluwer solutions across the hospital to help ensure that all of our clinical

teams are working to consistently achieve high standards of care and follow best practice guidelines. We want clinicians to have access to up-to-date information at the point of care so they can make the best decisions for patients."

### Less time researching, more time helping patients

MDH receives around 1,600 patients daily. Due to this high demand, continuously modernizing the hospital and adopting the most advanced technology are crucial to maximizing its operational efficiency.

Clinical decision support resources including UpToDate and Lexicomp put the latest evidence and expert recommendations in the hands of clinicians when and where they need it. This reduces time spent researching to determine the best course of action, empowering staff to focus on what matters most – patients.

Integrating Medi-Span drug screening into the Electronic Medical Record (EMR) automates prescribing processes, raising operational efficiency, and reducing drug errors.

Sariryah is unique in its approach in enhancing efficiency as all three Wolters Kluwer evidence-based solutions – UpToDate, Medi-Span, and Lexicomp – are integrated into the clinical workflow, which means

that they can be accessed quickly and easily via the EMR, saving clinicians' time.

### UpToDate – the evidence-based resource that medical professionals trust

UpToDate incorporates the editorial rigor and clinical domain expertise of more than 7,300 physician authors, editors and peer reviewers, with over 12,000 topics in 25 specialties. Doctors, nurses and pharmacists use UpToDate to diagnose, treat and educate patients.

By using UpToDate to further their knowledge, clinicians also stay aligned with the latest available evidence and best practices. They collect CME points within UpToDate as evidence of their continuous learning and ongoing medical education.

UpToDate is an invaluable tool that helps clinicians provide the best possible care and outcomes for patients. They trust UpToDate to give them expert guidance and recommendations, particularly when evidence is scarce or unclear.

UpToDate Advanced – a new generation of clinical decision support – is the latest Wolters Kluwer solution in the hospital's technology portfolio. The interactive guidelines within UpToDate Advanced help busy users make faster, safer decisions on topics that generate many

clinical questions. The Lab Interpretation module helps clinicians understand the best way to proceed upon receiving patients' lab test results. The decisions made can be saved into the EMR for patient history and auditing purposes.

### Lexicomp drug information helps reduce medication errors

With an increasing volume of drug information and complexities arising from polypharmacy, it is impossible for clinicians to remember everything they need to know, or even to spend time researching information. Lexicomp gives pharmacists, doctors, and nurses at MDH access to the latest drug information, including potential adverse reactions, interactions, and patient education materials.

Lexicomp enables users to quickly obtain all the information they need to prescribe and administer drugs while maintaining the highest levels of patient safety.

### Medi-Span embedded drug screening increases efficiency and reduces alert fatigue

Innovation and technology adoption are top priorities for Sariryah, given that they support the institution's strategic aim to deliver high quality, cost-effective, and efficient care.

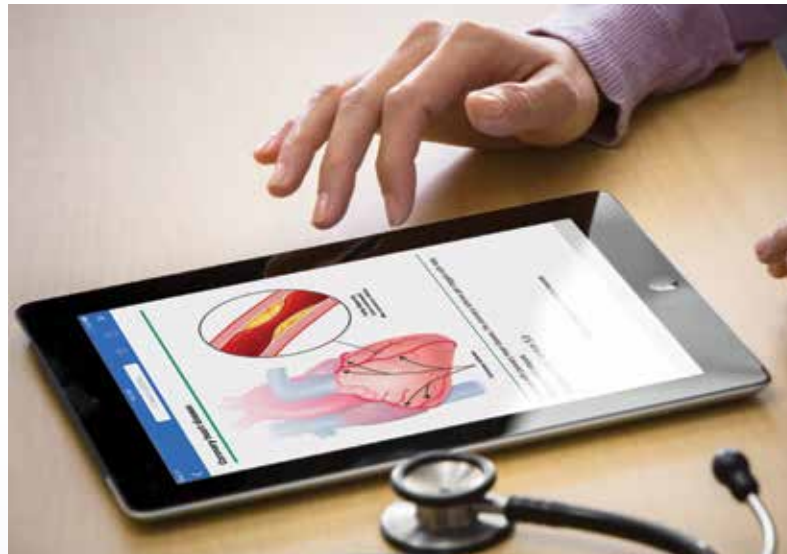
As part of the company's digitisation strategy, the organisation required a drug screening solution that could be integrated into its EMR. The hospital selected Medi-Span, which automatically screens drug information against patient data to identify potential medication errors.

Medi-Span has also helped increase departmental efficiency and freed up pharmacists to focus on other activities. The Medi-Span 'command center' has allowed MDH to create sophisticated personalised alert systems, eliminate unnecessary alerts, and reduce alert fatigue.

### Easy access to clinical information, when and where it's needed

Clinicians at MDH can access UpToDate and Lexicomp via the hospital EMR, a laptop, or a portable device, making the resources ideal to use on the move – whether in a clinic, a ward, or a training room.

According to Mr. Al-Thaqafi: "Clinical



Sariryah recognises the great impact UpToDate has had in MDH by supporting our doctors to make the right medical decisions. UpToDate has helped Sariryah to achieve its aim of providing comprehensive and integrated medical care for patients and their relatives, as well as delivering services that maintain and improve the health of our society.

-- Mr. Salem Al-Thaqafi, Vice Chairman, Sariryah Medical Company

teams have expressed overwhelming support and positive feedback for the solutions. They give confidence and validation to clinicians that they are making the best decisions for patients, which are supported by the latest evidence and best practice."

Regular training and ongoing support ensure that clinicians know how to leverage UpToDate, Medi-Span, Lexicomp, and UpToDate Advanced. Training ensures clinicians can take advantage of the latest available developments and tools to deliver efficient, high quality care.

### Providing the best possible care during the COVID-19 pandemic

During the COVID-19 pandemic, UpToDate, and Lexicomp were the trusted 'go-to' resources for clinicians who needed access to the latest evidences and guidance to help them care for patients.

Mr. Al-Thaqafi continued: "People had many questions related to COVID-19 and these resources made it possible to answer

all questions related to their medical case. As a result of the pandemic, we also provided a tele-medicine service to answer and communicate with our patients. In some cases, patients had high levels of anxiety because they could not come to the hospital; hence, the use of this tool has helped doctors and the medical staff to communicate effectively online and provide apt medical advice.

"We would absolutely recommend UpToDate, Lexicomp, and Medi-Span to any hospital looking for evidence-based solutions associated with improved patient outcomes, increased efficiency and enhanced provision of exceptional care. Giving our teams access to the clinical information, which they need along the patient pathway and in the clinical workflow, is integral to deliver quality healthcare services. Given all these, I'm confident that we will continue to use these tools in all hospitals and medical facilities that we manage and will manage in the future." MEH





# COVID-19 pandemic worsened pregnancy outcomes for women and babies worldwide

Pregnancy outcomes for mothers and babies have worsened during the COVID-19 pandemic, a review of data from 40 studies representing 17 countries published March 31, 2021 in *The Lancet Global Health* journal has revealed.

Findings varied by country but analysis of pooled data showed stillbirth and maternal mortality rates increased by approximately one-third during the pandemic compared to life before COVID-19 took hold (stillbirth rates: during pandemic 1099/168,295 pregnancies vs before pandemic 1325/198,993 pregnancies; maternal mortality rates: during pandemic 530/1,237,018 pregnancies vs pre-pandemic 698/2,224,859 pregnancies).

Mental health outcomes also worsened

during the pandemic. Of the 10 studies included in the analysis that reported on maternal mental health, six reported an increase in postnatal depression, maternal anxiety, or both.

Overall, outcomes were worse in low- and middle-income countries as compared to high-income countries and the researchers say immediate action is required to preserve safe maternity care worldwide, especially during the global pandemic.

Although the study did not analyse the impact of COVID-19 infection during pregnancy, it provides the first global assessment of the collateral impact of the pandemic on antenatal, birth, and postnatal outcomes.

Professor Asma Khalil, lead author of the

study, of St George's University of London, said: "The COVID-19 pandemic has had a profound impact on health care systems around the world. Disruption to services, nationwide lockdowns, and fear of attending health care facilities mean that the adverse effects of COVID-19 are expected to have health consequences that extend beyond the deaths and disease caused by the virus itself. It is clear from our study and others that the disruption caused by the pandemic has led to the avoidable deaths of both mothers and babies, especially in low- and middle-income countries. We urge policymakers and health care leaders to prioritise safe, accessible, and equitable maternity care within the strategic response to the pandemic and aftermath,

to reduce adverse pregnancy outcomes worldwide.”

Studies from individual countries have suggested that the pandemic has affected rates of stillbirth and pre-term birth, potentially as a result in a reduction of healthcare-seeking behaviour for fear of infection, as well as reduced provision of maternity services.

In this latest study, researchers reviewed data from 40 studies that were published between 1 January 2020 and 8 January 2021, representing 17 countries and with data from more than 6 million pregnancies. All of the studies compared pregnancy outcomes during and before the pandemic, but studies that focused solely on SARS-CoV-2 infected women were excluded.

### Stillbirth

Of the studies included in the review, 12 reported on the incidence of stillbirth. Analysis of the pooled data found the chances of having a stillbirth were increased by more than a quarter compared with pre-pandemic instances (odds of stillbirth increased 28%; stillbirth rate during pandemic: 1,099/168,295 pregnancies, stillbirth rate before pandemic: 1,325/198,993 pregnancies).

### Maternal mortality

The review included two studies that investigated the impact of the pandemic on maternal death rates, both from middle-income countries (one from India and one from Mexico). Pooled analysis of data from both studies found that the risk of mothers dying during pregnancy or childbirth was increased by more than a third compared with before the pandemic (maternal death rate: during pandemic, 530/1,237,018 pregnancies vs pre-pandemic: 698/2,224,859 pregnancies). This finding was dominated by the study from Mexico, which represented the majority of pregnancies included in the analysis (Mexico study 3,452,141/3,468,086 pregnancies [99.7%], India study 9,736/3,468,086 pregnancies [0.3%]).

### Pre-term birth

The review did not find any difference in overall rates of pre-term birth before and

We have an unprecedented opportunity to learn from the experiences of the COVID-19 pandemic to plan for a future of inclusive and equitable maternity care worldwide. One such learning opportunity will be to investigate the mechanisms underlying the apparent reduction in pre-term births observed in high-income settings during the pandemic, with a view to identifying new preventative interventions that could potentially benefit all women worldwide.

during the pandemic. However, pooled data from studies from high-income countries suggests that, in this setting, the odds of preterm birth were reduced by almost 10% during the pandemic. The authors say the reduction appears to be driven by a drop in spontaneous pre-term birth, rather than those requiring medically indicated early induction of labour or cesarean section, which may be increased. They say this means it is more likely that changes in health care delivery and population behaviours are contributing factors, which may bring valuable lessons for understanding the mechanisms underlying preterm birth. The odds of having a pre-term birth in low- and middle-income countries were unchanged.

### Ectopic pregnancies

From the three studies that reported on the use of surgery for treatment of ectopic pregnancies, analysis of pooled data revealed that surgery rates were almost six times higher during the pandemic compared with before, after accounting for the size of the included studies (surgery rate for ectopic pregnancies across all studies during pandemic 27/37, pre-pandemic 73/272). If discovered early, ectopic pregnancies can typically be treated with medication, meaning this increase in surgeries may be an indication that

more women delayed seeking care.

The variation in outcomes reported between different studies may be partially explained by inefficiencies in healthcare systems in the countries studied, the researchers found. Differences in pandemic mitigation responses between countries did not seem to affect the findings, however. The researchers say this suggests the increase in adverse pregnancy outcomes may be driven by pressures on healthcare systems caused by COVID-19 itself, rather than measures aimed at limiting the spread of the virus, such as lockdowns.

### Pregnancy complications

The review did not identify any changes in reporting of other pregnancy complications during the pandemic, including gestational diabetes or pregnancy disorders linked to high blood pressure. There were no observed changes in delivery outcomes during the pandemic either, such as caesarean section or spontaneous vaginal delivery or the rate of pregnancies requiring induction of labour. Despite these numbers remaining steady, the researchers none the less say their findings provide clear indication that women and babies have experienced worse health outcomes during the pandemic. They highlight the need to prioritise safe, accessible, and equitable maternity care within the strategic

response to this pandemic and in future health crises.

Dr Erkan Kalafat, a co-author of the study from Koc University, Turkey, said: "We have an unprecedented opportunity to learn from the experiences of the COVID-19 pandemic to plan for a future of inclusive and equitable maternity care worldwide. One such learning opportunity will be to investigate the mechanisms underlying the apparent reduction in preterm births observed in high-income settings during the pandemic, with a view to identifying new preventative interventions that could potentially benefit all women worldwide."

### Study limitations

The authors note several limitations to their findings. Notably, the studies included in their analysis varied in the way pregnancy outcomes were defined and measured, which makes it difficult to compare results between studies. There were fewer studies from low- and middle-

income settings, and this is concerning as the analysis shows substantial variation in outcomes between high- and low-income settings. The authors also note that they cannot exclude the risk of publication bias against studies reporting negative findings, although they did not find any evidence of bias when they tested for this.

Writing in a linked Comment article, Dr Jogender Kumar, of the Postgraduate Institute of Medical Education and Research, India, who was not involved in the study, said: "There was significant heterogeneity in outcomes between HICs and LMICs, and the rates of the adverse outcomes were much higher in LMICs. These findings highlight disparities in health care within and across countries."

He added: "In resource-poor countries, even under normal circumstances, it is a challenge to provide adequate coverage for antenatal check-ups, obstetric emergencies, universal institutional deliveries, and respectful maternity care. The COVID-19 pandemic has widened this gap and

exposed several lacunae of healthcare systems worldwide, but more so in LMICs."

The study was carried out by researchers from St George's University of London (UK), Middle East Technical University (Turkey), Koc University (Turkey), London School of Hygiene and Tropical Medicine (UK), The Royal College of Obstetricians and Gynaecologists (UK), University College London Hospitals NHS Foundation Trust (UK), Norfolk and Norwich University Hospitals NHS Foundation Trust (UK), North Bristol NHS Trust (UK), University of Birmingham (UK), Public Health England (UK), Royal College of Paediatrics and Child Health (UK) and Kings College London (UK).

### Reference:

Effects of the COVID-19 pandemic on maternal and perinatal outcomes: a systematic review and meta-analysis. *The Lancet Global Health*. doi: [https://doi.org/10.1016/S2214-109X\(21\)00079-6](https://doi.org/10.1016/S2214-109X(21)00079-6)

# Heart attack diagnosis missed in women more often than in men

Chest pain is misdiagnosed in women more frequently than in men, according to research presented March 10 at ESC Acute CardioVascular Care 2021, an online scientific congress of the European Society of Cardiology (ESC). The study also found that women with chest pain were more likely than men to wait over 12 hours before seeking medical help.

"Our findings suggest a gender gap in the first evaluation of chest pain, with the likelihood of heart attack being underestimated in women," said study author Dr. Gemma Martinez-Nadal of the Hospital Clinic of Barcelona, Spain. "The low suspicion of heart attack occurs in both women themselves and in physicians, leading to higher risks of late diagnosis and misdiagnosis."

This study examined gender differences in the presentation, diagnosis,

and management of patients admitted with chest pain to the chest pain unit of an emergency department between 2008 and 2019. Information was collected on risk factors for a heart attack including high blood pressure and obesity. The researchers recorded the physician's initial diagnosis after the first evaluation of each patient, which is based on clinical history, physical examination, and an electrocardiogram (ECG) and occurs before other examinations like blood tests.

"We had the first impression of the doctor as to whether the chest pain had a coronary cause or another origin such as anxiety or a musculoskeletal complaint," explained Dr. Martinez-Nadal.

A total of 41,828 patients with chest pain were included, of which 42% were women.

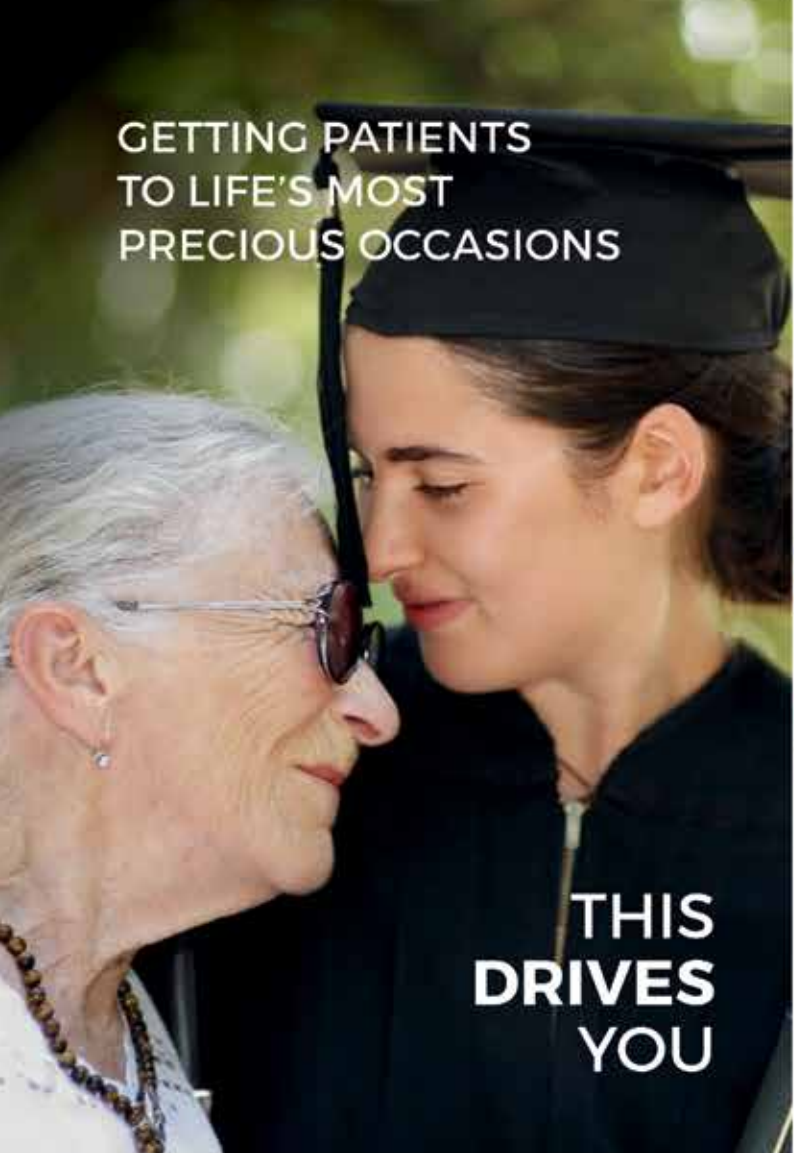
The median age was 65 years in women and 59 years in men. Women were significantly more likely to present late to the hospital (defined as waiting 12 hours or longer after symptom onset): this occurred in 41% of women compared to 37% of men.

"This is worrying since chest pain is the main symptom of reduced blood flow to the heart (ischaemia) because an artery has narrowed," said Dr. Martinez-Nadal. "It can lead to a myocardial infarction which needs rapid treatment."

In the physician's initial diagnosis, acute coronary syndrome was more likely to be considered the cause of chest pain in men compared to women. Specifically, in 93% of patients, the ECG did not provide a definitive diagnosis. In those patients, the doctor noted a probable acute coronary syndrome (ACS) in 42%

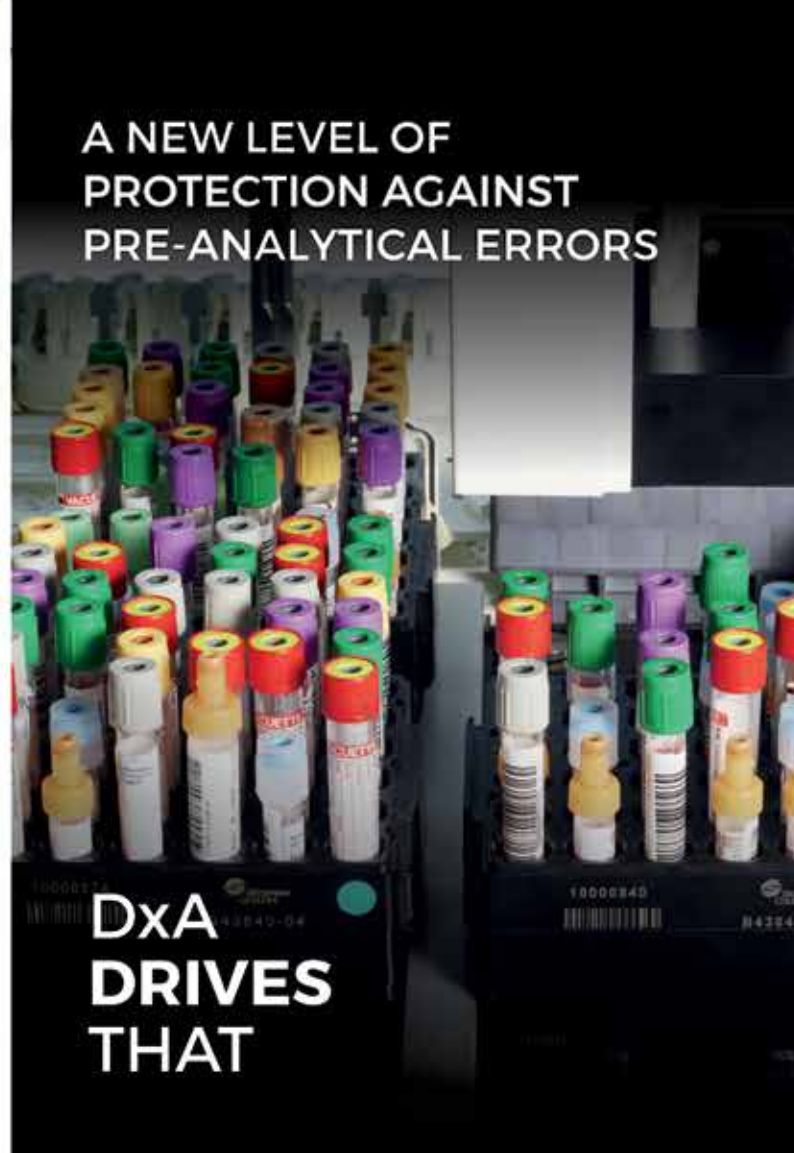


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of cases – when analysed according to gender, probable ACS was noted in 39% of women and 44.5% of men ( $p < 0.001$ ). The significantly lower suspicion of ACS in females was maintained regardless of the number of risk factors or the presence of typical chest pain.

Dr. Martinez-Nadal said: “In the doctor’s first impression, women were more likely than men to be suspected of a non-ischaemic problem. Risk factors like hypertension and smoking should instil a higher suspicion of possible ischaemia in patients with chest pain. But we observed that women with risk factors were still less likely than men to be classified as ‘probable ischaemia’.”

In women, 5% of ACS were initially misdiagnosed, whereas in men, 3% of ACS were initially misdiagnosed ( $p < 0.001$ ). After multivariate analysis, female gender was an independent risk factor for an initial impression of non-ACS.

Dr. Martinez-Nadal said: “Heart attack

has traditionally been considered a male disease, and has been understudied, underdiagnosed, and undertreated in women,

who may attribute symptoms to stress or anxiety. Both women and men with chest pain should seek medical help urgently.” 



## Pregnancy, stress, sleep issues, physiology among women's unique cardiovascular concerns

Women face many female-specific risks for heart disease and stroke, including pregnancy, physical and emotional stress, sleep patterns and many physiological factors, according to multiple studies highlighted in this year's 'Go Red for Women' special issue of the *Journal of the American Heart Association*, published online February 23.

“Although cardiovascular disease is the leading cause of death in men and women, women are less likely to be diagnosed and receive preventive care and aggressive treatment compared to men,” said *Journal of the American Heart Association* Editor-in-Chief Barry London, M.D., Ph.D., the Potter Lambert Chair in Internal Medicine, director of the division of cardiovascular medicine, director of the Abboud Cardiovascular Research Center, professor

of cardiovascular medicine and professor of molecular physiology and biophysics at the University of Iowa's Carver College of Medicine. “Identifying and addressing the unique ways cardiovascular disease affects women is critical to improving outcomes and saving lives, and we're pleased to highlight this very important and impactful research.”

Of note in this issue is a report from the American Heart Association's Go Red for Women Strategically Focused Research Network. Launched in Spring 2016, this initiative funded five research centres to extensively study cardiovascular (CVD) risk in women:

- Columbia University Irving Medical Center in New York City – *Sleep & CVD Risk in Women Across the Lifespan*

- Johns Hopkins University School of Medicine in Baltimore – *Role of Sex Hormones and Cyclic GMP-PKG in Cardiac and Metabolic Disorders in Patients with Heart Failure with preserved Ejection Fraction (HFpEF)*

- Magee-Women's Research Institute and Foundation in Pittsburgh – *Women's Cardiovascular Health and Microvascular Mechanisms: Novel Insights from Pregnancy*

- New York University Langone Medical Center in New York City – *The Women's Heart Attack Research Program: Mechanisms of Myocardial Infarction with Non-Obstructive Coronary Arteries (MINOCA), Platelet Activity and Stress*

- University of California at San Diego – *Sedentary Behavior & CVD Risk in Latina Women*





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This report highlights the findings of the centres, showing how insufficient sleep, sedentariness and pregnancy-related complications may increase CVD risk in women. It also details the presentation and factors associated with myocardial infarction with non-obstructive coronary arteries and heart failure with preserved ejection fraction in women. Additional collaborative studies assessed the relations among CVD risks and various lifestyle behaviours including nightly fasting duration, mindfulness and behavioural and physical risk factors. Other research focused on metabolomic profiling of heart failure with preserved ejection fraction in women.

Many of the studies in the Association's Strategically Focused Research Network have been published in scientific journals and presented at scientific meetings, and significant research continues. The findings generated by the initiative and the new investigators trained in multidisciplinary research, will further promote awareness among the public and in the medical field about the female-specific factors that influence CVD.

Below are highlights of additional manuscripts focused on cardiovascular disease in women in this special issue of the *Journal of the American Heart Association*.

### Early pregnancy atherogenic profile in a first pregnancy and hypertension risk 2-7 years after delivery – Janet Cotav, et al.

In the nuMoM2b-Heart Health Study, researchers evaluated whether cardiometabolic risk factors identified early in a first pregnancy were related to adverse pregnancy outcomes (APO) and/or gestational diabetes (GDM), as well as subsequent maternal hypertension 2-7 years after giving birth.

The multicentre cohort of 4,471 women were tracked for adverse pregnancy outcomes including hypertensive disorders of pregnancy, preterm delivery, low birthweight for gestational age and gestational diabetes and for their risk of hypertension (130/80 mmHg or antihypertensive use) 2-7 years after giving birth.

Among all participants, 24.6% of the women (1,102) experienced an adverse pregnancy outcome or gestational diabetes

during a first birth. Women with at least one of these complications were, on average, more likely to be older than 35, to smoke, and to be of non-Hispanic Black race/ethnicity.

Women with an APO or GDM were more likely to have an elevated cardiovascular risk profile in the first trimester: they were more likely to have obesity (34.2%

vs. 19.5%); had a higher mean blood pressure (SBP 112.2 mm Hg vs. 108.4 mm Hg; DBP 69.2 mm Hg vs. 66.6 mm Hg); had higher mean concentrations of glucose (5.0 vs. 4.8 mmol/L); had a higher median level of insulin (77.6 pmol/L vs. 27 60.1 pmol/L); high triglycerides (1.4 mmol/L vs. 1.3 mmol/L) and hsCRP, high sensitivity c-reactive protein, a marker for in-



flammation (5.6 nmol/L vs. 4.0 nmol/L); or had lower HDL-C or good cholesterol (1.8 mmol/L vs. 1.9 mmol/L).

A total of 32.8% of women with APOs or GDM had hypertension (blood pressure  $\geq$ 130/80 mmHg or took blood pressure medication) within 2-7 years after delivery, compared to 18.1% of women with no APO or GDM. Compared to women with no complications, those who had an APO or GDM had higher rates of elevated blood pressure (7.6% vs. 6.3%) and stage 1 (19.9% vs. 13.3%) and stage 2 hypertension (12.9% vs. 4.8%). After accounting for confounders (age, race/ethnicity, insurance status and smoking), early pregnancy BMI, total cholesterol, HDL-C, LDL-C, glucose, insulin, hsCRP, triglycerides, blood pressure, diet quality and physical activity were all related to increased risk of hypertension 2-7 years after giving birth.

The researchers said because women typically have access to health care during pregnancy and postpartum, assessment of cardiometabolic health early in pregnancy may help to identify risk for APO and GDM and to identify opportunities to improve cardiovascular health later in life.

### **The Associations of Job Strain, Life Events and Social Strain with Coronary Heart Disease in the Women's Health Initiative Observational Study - Yvonne Michael, et al**

Researchers analysed long-term health data for 80,825 women in the Women's Health Initiative Observational Study, who had a mean age of 63.4 years when they enrolled in the study, and they were followed for an average of 14.7 years. They aimed to determine the independent and synergistic effect of different stress domains, including work, stressful life events and social relationships, on women's coronary heart disease (CHD) risk.

Job strain was determined by factoring in job control (whether workers can exert influence over tasks) and job demand (the workload and intensity of the job). Stressful life events and social strain were assessed through self-reported questionnaires. Cox proportional hazard models were used to evaluate associations of each stressor with CHD separately and together.

A total of 3,841 women (4.8%) devel-

oped coronary heart disease during an average of 14.7 years of follow-up. After adjustment for age, other stressors, job tenure and socioeconomic factors, highly stressful life events were associated with a 12% increased risk of CHD, and high social strain was associated with a 9% increased risk of CHD. While job strain was not independently associated with CHD risk, researchers observed a statistically significant interaction between job strain and social strain. Women who had high social strain but low job control and low job demand had a 21% increased risk of CHD.

Researchers concluded that stressful life events and social strain were each associated with increased risk of CHD among women. For job strain, the increased CHD risk was confounded by socioeconomic factors. Exposure to job strain and social strain interacted synergistically, resulting in a higher risk of CHD than expected from exposure to either stressor alone.

### **Sexual Assault and Carotid Plaque among Midlife Women – Rebecca Thurston, et al.**

Researchers in this study examined whether women who reported being the victim of sexual assault had higher carotid artery plaque build-up levels and if those levels continued to rise during midlife. Study participants included 160 non-smoking, CVD-free women ages 40-60 years, 28% of whom reported being the victim of sexual violence. The women were assessed twice between 2012 and 2020, and at both evaluations, they completed questionnaires, physical measures, blood tests and ultrasounds to measure plaque build-up in the carotid artery.

Compared to women who did not report a history of sexual assault, the women who were victims of sexual violence were four times more likely to have plaque build-up of more than 30% of the carotid artery at baseline and three times more likely to have that extent of plaque build-up at follow-up.

Researchers said their findings indicate sexual assault is associated with a higher level of carotid atherosclerosis, and the levels appear to increase over midlife. The associations were not explained by standard CVD risk factors, depression or symp-

oms of post-traumatic stress.

Other studies in this special issue include:

- Sex differences in the association of body composition and cardiovascular mortality - Preethi Srikanthan, et al.

- Maternal coronary heart disease, stroke and mortality within one, three, and five years of delivery among women with hypertensive disorders of pregnancy and pre-pregnancy hypertension – Angela Malek, et al.

- Gender issues in Italian catheterization laboratories: The GENDER-CATH Study - Chiara Bernelli, et al.

- Breast cancer promotes cardiac dysfunction through deregulation of cardiomyocyte calcium handling protein expression that is not reversed by exercise training - Carlos Negrao, et al.

- Long-term postpartum cardiac function among women with preeclampsia - Sajid Shahul, et al.

- Sex differences in heart failure with preserved ejection fraction - Shungo Hikoso, et al.

- Healthy lifestyle and clonal hematopoiesis of indeterminate potential - Results from the Women's Health Initiative - Bernhard Haring, et al.

- Gender differences in publication authorship during COVID-19: A bibliometric analysis of high impact cardiology journals - Nosheen Reza, et al.

- Developing an internally validated Veterans Affairs women's cardiovascular disease risk score using Veterans Affairs national electronic health records - Haekyung Jeon-Slaughter, et al.

- The Women in cardiology Twitter network: An analysis of a global professional virtual community from 2016 to 2019 - Janet Han, et al.

- A paucity of female interventional cardiologists: What are the issues and how can we increase recruitment and retention of women? - Cindy Grines, et al.

- Sex differences in rupture risk and mortality in untreated patients with intact abdominal aortic aneurysms – Rebecka Hultgren, et al.



The complete manuscripts can be accessed here:

<https://www.ahajournals.org/go-red>



## Omnicell to showcase latest automation and intelligence solutions at Arab Health 2021

*Medimat takes centre stage as Omnicell showcases portfolio of cutting-edge technology for central pharmacy*

Omnicell Inc., a leading provider of medication and supply management solutions and adherence tools for healthcare systems and pharmacies, is set to unveil its latest robotic dispensing system – Medimat – to the Middle East pharmaceutical industry at this year’s Arab Health (21-24 June, 2021), at the Dubai World Trade Centre.

The next generation Medimat is the latest enhancement to Omnicell’s portfolio of technologies for central pharmacy workflows, helping to dramatically improve all aspects of the dispensing process. By simplifying the dispensing process and minimising the number of human interactions in the pharmacy workflow, Medimat’s new functionality will further reduce the potential for errors.

For pharmacists in particular, a lack of inventory precision and control can result in large quantities of expired stock and significant monetary losses. Smarter and safer medication management technology is key to reducing the burden on healthcare teams, supporting them in providing the right medication, at the right dose, at the right time.

“Automation has become an integral part of any healthcare setting and we are committed to the continual development of our technologies in order to support the vital process of medication and supply management,” said Sara Dalmasso, International Vice President and General Manager for Omnicell International. “We are thrilled to be a part of such a well-respected and dedicated platform as Arab Health, which is recognised as the Middle East’s largest in-person healthcare event. It will provide an outstanding opportunity to introduce Medimat to healthcare professionals in the region, as well as showcase Om-

nicell’s other industry-leading solutions.

“Medimat will support the healthcare industry by improving efficiency, driving savings, and freeing up staff from administrative and logistical tasks, such as unpacking medication, stock management and searching for medication. Crucially, it will enable pharmacists to spend more time on clinical work and building patient relationships.”

Additional benefits of Medimat include:

- Pharmacists will know where the drug is within the robot and what quantities are available.
- Ability to track slow-moving items and eliminate wasted or out-of-date stock.
- Ability to generate a real time report on stock usage, so manual stock counts are no longer needed, saving valuable time.
- Highly effective scan station means inputting of medication supports safety.
- Direct mode option enables users to have medication available for immediate dispensing.
- Input speed of up to 750 packs per hour allows for more prescriptions to be processed with a higher level of accuracy

### Point-of-care solutions

Omnicell will also be showcasing other key point-of-care solutions at this year’s event, including:

- **MedX** – the only web-based, software solution for medication management and inventory in both open and closed stores. It allows complete visibility on all pharmaceutical stock holding areas and its data capture assists in reducing unnecessary spend and medication waste. This also includes OmniCD which eliminates the need for double processing, with the ability



Sarah Dalmasso, International Vice President and General Manager for Omnicell International

to fully automate a location by managing and ordering controlled drugs through automation cabinets while still maintaining legal compliance.

- **SupplyX** – helping healthcare settings improve management and traceability of medical supplies. This solution simplifies and automates the inventory management process with a real-time web-based dashboard and reporting suite for materials’ managers.

- **Omnicell XT Medication and Supply Cabinets** – supports a safer and smarter process for getting the right medication to the right patient at the right time.

- **Omnicell Supply RFID cabinet** – ideal for high-cost items, implantable devices and trauma trays. The system scans everything quickly, and records what has been taken, returned or re-stocked.

Omnicell technology has been supporting healthcare providers in the Middle East for 17 years, including King Faisal Specialist Hospital (KSA), National Guard Health Affairs (KSA) and Dubai Health Authority (UAE). The Company’s proven and streamlined range of solutions and services are designed to reduce medication dispensing errors, improve patient safety, drive efficiency, and allow healthcare professionals to spend more time on face-to-face patient care.

- Omnicell will be at Stand Number **H4 C10** Arab Health 2021.
- To learn more, visit [www.omnicell.com](http://www.omnicell.com)



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# Optimizing cancer care through precision and collaboration

Cancer affects us all. Millions of people around the world are living with the disease and every year millions more are newly diagnosed.

The Middle East is no exception to the growing burden of cancer with breast cancer being the most prevalent, followed by lung cancer, cervical cancer, colorectal cancer, and prostate cancer. In 2012 alone, cancers in Islamic countries caused 1.02 million deaths, accounting for 12% of the cancer deaths worldwide<sup>[1]</sup>.

Cancer care is increasingly complex, with the impact of new innovations in diagnostics and treatment being hindered by inefficiencies such as multiple patient handoffs, limited integration across specialties and incomplete or excess patient data, all of which can result in missed, delayed or imprecise diagnosis.

“As a series of defining moments - from screening and detection through to surveillance, assessment and follow-up care - optimized cancer care acknowledges that early cancer detection and treatment is only part of the story,” says Vincenzo Ventrucelli, Chief Executive Officer for Middle East, Turkey & Africa at Philips. “Assessing response to treatment and adjusting treatment based on evidence-based protocols and genomics is just as important.”

As a leader in health technology, Philips champions immediate and ongoing optimization across the care continuum to enable a clear care pathway with predictable outcomes for every patient.

## Precision diagnosis

The top priority in cancer care is to assist physicians to make accurate diagnosis the first time and in less time. In response, Philips has a wide portfolio of imaging solutions for detection and diagnosis including detector-based spectral CT, delivering multiple layers of retrospective data in a single, low-dose scan as well as MRI prostate care solutions – expanding the power of MRI beyond radiology<sup>[2]</sup>.

Another example is the EPIQ Elite ultrasound platform that brings clinically

tailored tools designed to elevate diagnostic confidence to new levels. For instance, the ultimate breast assessment solution<sup>[3]</sup> helps clinicians provide patients with the diagnosis and treatment they need when fighting breast cancer.

The use of an enterprise-wide digital pathology platform such as the Philips IntelliSite Pathology Solution<sup>[4]</sup> contributes to earlier and more accurate detection and tissue assessment. A digital pathology solution can lead to a decrease in the rate of interpretation errors, especially in difficult and diagnostically rare diseases conducted by non-subspecialized pathologists. It can also save time for pathologists in administration tasks such as matching slides and paperwork to cases, transporting cases, error correction, and retrieving prior records. This frees up capacity for a higher volume of patients.

Telehealth and telecollaboration has a critical role to play in diagnosis, especially in remote regions where patients might not have access to leading technology or expertise. In support, innovations such as the Philips Lumify with Reacts<sup>[5]</sup> offer truly integrated tele-ultrasound solutions that bring professionals, places, and patients together to make a real difference at the point of care.

## Close multi-disciplinary collaboration

A second priority in the fight against the negative impact of cancer on our communities is to arm care teams with expert clinical guidance, timely access to relevant information and a holistic view of the patient by integrating departments to create a unified patient view for collaborative decision making.

Philips virtual tumour board<sup>[6]</sup> allows the extended clinical team to see all pieces of the patient puzzle in one overview; transforming and enhancing the tumour board process.

By automatically pulling together information from disparate sources – including EMRs, lab, pathology, radiology, and genomics data – Philips cuts down manual preparation time for all involved, and supports timely, informed treatment decisions.

As a series of defining moments - from screening and detection through to surveillance, assessment and follow-up care - optimized cancer care acknowledges that early cancer detection and treatment is only part of the story.

## Personalised treatment

This is realized through Philips Oncology Pathways Guide<sup>[7]</sup> powered by Dana-Farber Cancer Institute; offering established standardized and evidence-based treatment selections to empower physicians to provide highly personalized care.

“These efficiencies can fast-track intervention at each defining moment including starting of treatment, realizing opportunities for early intervention and adjustment of treatment plans to optimize the outcomes and experience – for patient and caregiver,” says Ventrucelli.

- For more information, visit:

<https://www.philips.ae/healthcare/medical-specialties/oncology> 

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## Picture this: how medical printing will add marketing value to sterile healthcare organisations

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Simple measures, such as a friendly, personal service make all the difference for patients during doctor visits, and if those measures were reflected in the medical results and documentation supplied to patients, medical organisations could benefit from increased confidence and patient satisfaction.

Businesses and healthcare organisations offering radiology services, such as cardiologists, gynaecologists, medical centres and others with X-ray facilities, must rely on medical imaging manufacturers to produce informative, easy-to-digest images. These essentially enable medical staff to recognise medical complications, assert the best course of action, and help patients understand complex issues.

#### Building patient trust

For medical imaging manufacturers, there is a clear opportunity to help those organisations offering radiology services to build trust with their patients while reducing time spent describing those complex issues. Presenting patients with sharp, high quality colour images will undoubtedly increase the ease of describing issues and treatments. For patients, this creates a friendlier more personalised and satisfying experience that will provide a valued level of comfort during an otherwise daunting experience.

However, the benefits of DICOM are only recognised by medical imaging manufacturers and medical staff.

Traditionally, DICOM image files are not easy to share with patients. While oth-

er image file formats such as JPEG, PNG or TIFF are recognised and easily read by personal computers, DICOM files are not recognised by the standard PC or Mac personal computers. While medical organisations could share the images via email, the patient would require additional software in the form of a DICOM viewer to access the file and would need additional information in a separate text file to explain the image's findings.

#### Personalising the patient experience

This is where medical imaging manufacturers can provide a simple yet effective solution in the form of personalised booklets, providing a referenceable take-home source of information for patients, including a post-diagnosis radiology report and detailed, high quality images. To maximise their marketing value, the booklets should include relevant information alongside the images, explaining the findings of the scan or X-ray, or detailing proposed surgery where visual renderings of potential surgical procedures can be presented in the booklet.

Through variable data printing, the booklets can be further personalised with the patient's name, surname and date of birth clearly displayed on the front cover.

A patient requiring cosmetic surgery could be presented with an A3 colour booklet during the consultation stage, prior to deciding on whether to go ahead with the surgery. Having the personalised booklet with details of the procedure including before and after images, will enable the patient to make an informed decision.

For patients requiring dental care, the personalised booklet will help keep them

Personalised medical imaging could increase patient satisfaction in the healthcare industry.

-- Javier Lopez, General Manager, Vertical Solutions, OKI Europe Ltd

updated with the course of treatment, and new updated booklets during treatment will increase patient satisfaction by highlighting the patient's progress on the road to recovery.

Personalised booklets will also be of great value to expecting parents, presenting high quality ultrasound scans that will provide a lasting keepsake which can be shared with friends and family members.

For medical organisations, there is opportunity to increase marketing value through increased satisfaction in a highly personalised experience. In turn, this creates a clear opportunity for medical imaging manufacturers that can provide high quality personalised booklets in a flexible range of formats and sizes that include sharp, colourful images that will inform and satisfy patients in an age of high expectations.

- Find out about OKI's unique DICOM embedded printers:

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- Learn more about OKI's medical health solutions:

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# Keeping gold cold: Securing, preserving and maximizing the value of Covid-19 vaccines

By Tarek Kassab, MD, MSc Biomed Eng,  
and James Waterson, RN, M.Med.Ed.  
Becton Dickinson, Medical Affairs



Vaccination has been lauded as one of the greatest achievements of modern civilization. Childhood infectious diseases that were commonplace less than a generation ago are now increasingly rare, and one of the greatest examples of the world uniting to advance health was the campaign to eradicate smallpox via mass-vaccination. Smallpox is practically forgotten now, despite the fact that the disease blighted humankind for centuries and carried a 30% fatality rate.

The Covid-19 pandemic, and the race to repeat the achievements of the smallpox campaign with initially limited supplies of vaccines, requires that we protect, track, utilize absolutely 'every drop' of vaccine available to us. The speed at which these vaccines have come to market also places a responsibility on us to produce actionable Real-World Evidence (RWE), as we deal with virus mutations and variants, and heterogenous population responses.

## Vaccine security

Medical device technology is central to the successful rollout, maintenance, and monitoring of high-quality vaccination programs. As soon as a vaccination clinic or health centre receives a supply of vaccine the issue of security and storage arises. There are already news reports of an emerging black market for Covid-19 vaccines and of 'mafias' looking to obtain these scarce resources. The core vaccines available also require judicious temperature control and an effective tracking of thawing, refrigeration,

removal from refrigeration, time spent at room temperature, and documented delivery to the patient.

## Vaccine tracking

Technology can assist in ensuring safety and maximized usage of all supplies as medical-grade 'intelligent' refrigerated units integrated to Automated Dispensing Cabinets ensure accurate temperature control and create alerts for any deviation. They can also track a vaccine vial's location through simple scanning processes and connected inventory systems. Distinct secure compartments within an integrated-intelligent fridge add the required security and access-privileges via codes or biometric recognition to enable tracking of the vial and alerting to any discrepancies in count.

The Institute for Safe Medication Practices (ISMP) suggests that vaccine centres and pharmacies carefully consider the timeframe for vaccine stability at room temperature and patient scheduling to minimize waste. A date and timestamp for removal of vials from the refrigerator is extremely valuable for both keeping this safe workflow going and for auditing. Verification of the doses needed per day from the vaccination centre to central cold-chain suppliers on a frequent basis – particularly in the case of those requiring ultra-cold temperatures – is also advocated by ISMP to prevent waste.

Medical grade, intelligent and inventory integrated, refrigeration units can also assist in this, as well in the allotment of

doses based on footfall trends through the centre. As the currently available vaccines all require a second-dose, this is particularly important for Group Purchasing Organizations that service many vaccine distribution centres and need to know regional or national stock levels.

## Real World Evidence

Vaccine usage data, when integrated into Electronic Medical Records (EMR), also has the potential to be a real asset for rapid review of appropriate and prudent usage. The societal value of reducing medication wastage has never been so well represented as it has been by the current crisis. Equally this data, as it can tie vaccine type, lot, vaccination date, and location to patient demographics from the EMR, assists in the gathering of Real World Evidence by specialized, effective tracking technology that has already shown an impact on the tracking of Antibiotic Microbial Resistance. This technology and knowhow are now being applied to help track and share Covid-19 insights with hospitals and public health agencies across the United States.

Given how potentially fragile an adequate global supply chain of vaccines is, utilization and protection are required in order to ensure these vital resources are shared as effectively and equably as possible. High rates of vaccine waste could potentially lead to extending the pandemic unnecessarily and make our societies vulnerable to continuing waves of infection. MEH

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# REALISM lets radiologists visualize a new level of detail in DR

After Cuero Regional Hospital implemented REALISM™ software, Konica Minolta Healthcare's next-generation advanced image processing software, repeat exposures in digital radiography dropped 20%\*. Technologists no longer make adjustments on every image, increasing their efficiency and enabling a higher patient throughput. Radiologists' productivity and diagnostic confidence are significantly enhanced with the sharpness and clarity of images, including the ability to visualize bone and soft tissue in X-rays. And, patients receive exceptional quality care in shorter exam times.

Nestled between Houston and San Antonio in South Texas, Cuero Regional Hospital offers many of the same services as larger urban-based hospitals.

According to Tyler Lemke, Director of Radiology, the hospital had been using Konica Minolta Healthcare CR systems since 2007. When it came time to upgrade the systems to DR, he naturally turned to the same company that he trusted for high quality and reliable X-ray imaging solutions.

Image quality is the most important feature of our imaging systems for our radiologists to make a confident diagnosis, enabling our clinicians to deliver high quality and more personalized patient care," Lemke says.

This level of image clarity is made possible because REALISM software processes bone and soft tissue data independently, revealing subtle details even in areas where bone overlaps soft tissue. The first time Lemke used REALISM software when imaging an extremity on a patient, he was very impressed by the clarity and sharpness of the images.

"In the wrist where there are many small bones, I immediately noticed the fine details and sharper images allowing me to see finite details of each bone," Lemke explains. "The images were so crisp the

bones just popped and the edges and trabeculae of every bone were very clear."

"We have also noticed that REALISM image processing enables us to visualize soft tissue without changing the window levelling, saving us time on each exam," Lemke adds. He says that it is most often used in exams of the neck to visualize bones and soft tissues, in the spine including lateral C-spines, chest X-rays and orthopaedic extremity imaging.

## Implementation is easy

REALISM image processing is easy to implement and use. A newly trained technologist who previously only used CR was able to quickly learn how to use and manipulate the new AeroDR wireless flat panel detectors with REALISM software after just one demonstration.

Lemke has seen first-hand improved department efficiency and workflow due to the increased image clarity and sharpness from REALISM software.

"With the previous system and software, I would make image adjustments prior to sending the images to PACS," Lemke says. "Now, with REALISM image processing, I rarely touch them. I almost always get exactly what I want with the new system, only occasionally needing to make an adjustment."

"Just recently, I was able to complete chest X-rays on three patients in eight minutes. That's getting them in, capturing the exam and letting them go," Lemke says.

Radiologist productivity and diagnostic confidence have also increased, which has



helped increase accuracy of the radiologists' reports. One radiologist has shared with Lemke that he can read through X-rays acquired with AeroDR wireless flat panel detectors and processed with REALISM software faster – without being concerned that he has missed anything.

"With REALISM and AeroDR, we can now see things in X-ray that we couldn't see before," Lemke says MEH



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# Benefits of regional anaesthesia during a pandemic

As hospitals and surgery centres navigate to resume elective and non-urgent surgical procedure volumes, there is heightened concern that the continued use of opioids for pain management before, during and after a procedure may perpetuate the current rise in opioid-related deaths. Similarly, the use of general anaesthesia potentially exposes physicians and staff to viral contamination when intubating a patient, releasing aerosols and droplets, which is a primary mode of transmission of COVID-19.

Although there is no one simple solution to address the public health issues of the opioid epidemic along with the COVID-19 pandemic, there is a technique that can reduce the likelihood of both addiction and viral transmission associated with surgical procedures: regional anaesthesia.

J. Douglas Jaffe, DO, an anaesthesiologist specializing in regional anaesthesia and acute pain management, says: “There is a substantial benefit to reducing the number of aerosol-generating procedures, such as intubation and extubation, when utilizing regional techniques for perioperative management in lieu of a general anaesthetic. We have also seen an increase in the acceptance, by both surgeons and patients, of spinal anaesthesia for the same reasons.”

Regional anaesthesia is a safe and effective type of pain management that doesn't involve the potential side effects and complications of general anaesthesia and sedation.

Ultrasound guidance is instrumental in the growing adoption of regional anaesthesia and analgesia by many anaesthesiologists. Studies suggest increased success, decreased complication rates, reduced time and greater patient comfort in ultrasound guided peripheral nerve block injections.

Dr Jaffe has also seen a marked increase in the utilization of ultrasound at the point of care for use in regional anaesthesia and analgesia. “Espousing the proven benefits of the use of ultrasound, which include reduced risk of vascular trespass and improved patient comfort and tolerance, otherwise reluctant patients who would

Simple Needle Visualization on the SONIMAGE HSI improves needle visibility (blue line) for increased accuracy in needle placement during regional anaesthesia and analgesia injections.



There is a substantial benefit to reducing the number of aerosol-generating procedures, such as intubation and extubation, when utilizing regional techniques for perioperative management in lieu of a general anaesthetic. We have also seen an increase in the acceptance, by both surgeons and patients, of spinal anaesthesia for the same reasons.

have declined a regional technique are increasingly accepting,” Dr Jaffe explains.

## Ultrasound visualization

Using ultrasound, the anaesthesiologist can locate important anatomy, such as the median nerve, ulnar nerve, radial nerve, etc., and visualize the needle as it enters the field of view, enters the nerve to deliver the block and visualize the spread of the local anaesthetic inside the region of interest.

So which ultrasound system features are critical when using it for regional anaesthesia?

Needle visualization is clearly key, but not all systems provide the same quality of needle visibility.

Algorithms that utilize both in-plane and

out-of-plane methods to improve needle visibility (both the tip and the shaft), especially in steep angle approaches, enable increased accuracy in needle placement.

Superior image quality that enhances signal penetration, improves resolution and increases colour flow sensitivity allows for detailed tissue differentiation and detection of small structures. An ultrasound probe that offers a trapezoid view, which extends the field of view, high sensitivity for scanning both deep and superficial structures and provides a small footprint to reach difficult to access areas and manoeuvre around the area of interest facilitates a more efficient regional anaesthesia injection.

The SONIMAGE® HS1 from Konica Minolta Healthcare meets all of these requirements for rapid and confident ultrasound guided regional anaesthesia and pain management procedures.

Regional anaesthesia delivers numerous benefits to patients and staff compared to general anaesthesia, including reduced need for opioids, no airway manipulation that could release viral aerosols, fewer complications and adverse events leading to less dependence on critical care services for patients, and faster time to discharge. Ultrasound guidance is key to successful implementation of a regional anaesthesia service. **MS+**





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## SEA Dialysis offers carefree holidays with dialysis on the beautiful Greek island of Mykonos

SEA Dialysis Mykonos is the first dialysis centre on Mykonos Island. It was created with the goal to enable dialysis patients from all over the world to visit and enjoy their vacation on this beautiful Greek island while securing their dialysis treatments.

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Our new state-of-the-art facilities comply with European health and safety directives and are designed to the high standards of a luxury hotel. They offer a seamless transition between your holiday activities in Mykonos and your dialysis treatments. The centre is open all year round.

Our spacious dialysis stations offer amazing views of the Aegean Sea while our experienced medical and nursing staff take care of patients at all times.

### Safety is top priority

SEA Dialysis uses the latest technology from Baxter – the Artis Physio Plus multi-therapy system – which offers a unique combination of efficient HD and effective HDF therapies,

providing you total control over the delivery of personalized haemodialysis treatments.

The water quality at SEA Dialysis is guaranteed by Watera's Reverse Osmosis (RO) technology.

### Expert team of nephrologists


Our team of expert nephrologists and experienced dialysis nurses supervise patients at all times during treatment. There is also a 24-hour on-call service for dialysis patients and nephrological emergencies.

SEA Dialysis is located next to the SEA Medical Health Clinic, a fully equipped primary care clinic with over 18 medical specialties, an emergency department and a state-of-the-art laboratory department, providing complete medical care to the standards of large private medical institutions.

### Patients benefit from:

- Expert nephrologists and experienced dialysis nurses supervising patients at all times
- Latest technology from Baxter, the Artis Physio Plus dialysis machines



- Multilingual staff
- Spacious dialysis stations with stunning views of the Aegean Sea
- Private VIP treatment suites 

## Carestream launches Lux 35 Detector, glass-free cesium detector for medical imaging

Carestream Health has launched its first cesium glass-free medical detector. The Carestream Lux 35 Detector is a lightweight, glass-free wireless detector ergonomically designed with the comfort of patients and radiographers in mind. The cesium detector offers superb resolution, better detail and a reduced exposure dose as compared to gadolinium detectors.

Weighing around 5 pounds (2.25 kg), the sleek 14" x 17" (35 cm x 43 cm) Lux 35 Detector, with its glass-free sensor, is Carestream's lightest detector to date.

"The lightweight Lux 35 Detector helps ease stress on radiographers, especially when doing mobile imaging as they are constantly moving the detector from machine to patient," said Jill Hamman, Worldwide Marketing Manager of Global X-ray Solutions at Carestream. "The lighter weight and er-

gonomic finger grips result in less stress and fatigue on radiographers."


The Lux 35's ergonomic design enables easier handling and positioning. Rounded and beveled edges provide more patient comfort when the detector needs to be placed behind or under a patient.

The Lux 35 supports a variety of image-processing options to assist radiologists, including Tube and Line Visualization, Pneumothorax Visualization, EVP Plus, Bone Suppression and many more.

The Lux 35 uses Carestream's ImageView Software powered by Eclipse for high image quality and consistent presentation. This detector also features the X-Factor, which means it can be shared with other compatible Carestream DRX equipment. LED lights on the detector provide immediate information on its status.



Additionally, the Lux 35 Detector battery is backwards compatible – it works with DRX Plus Detectors and uses the same battery charger.

- For more information, visit: [www.carestream.com](http://www.carestream.com) 

# Equipe MedCon offers cost-effective reusable antiviral clothes, gloves and caps

Equipe MedCon GmbH is the proud distributor of the PASTELLI surgical line of antiviral and antibacterial clothing. You can visit them in the Austrian area of Hall 6 at the Arab Health Exhibition in Dubai.

The Pastelli line of reusable clothing, designed and produced in Italy, is stylish and comfortable to wear.

The clothing line provides complete protection from viruses and bacteria. All products are CE certified and have undergone the strictest European tests. Halal certification is in process.

As the clothing is reusable, they avoid

the problem of the accumulation of waste that you get with disposable antiviral and antibacterial clothing. The certified antiviral and antibacterial treatment of the clothing continues to keep its protection even after many washes. As such, the cost per usage is comparable to disposable clothing.

The comfortable, safe-touch gloves are the latest addition to this line of clothing. They can be washed at least 30 times and continue to provide protection even in the most contaminated areas.

In the case of bulk quantities, any other article of clothing in the wide range offered



by the company can be given the antiviral and antibacterial treatment.

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- Tools for **fast, more efficient and precise therapies** including our IQon CT for treatment planning,
- Solutions for **earlier response**

**assessment and care plan adjustment** such as our virtual oncology tumour board

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Detector-based spectral CT acquires scans within a single exposure and with results on-demand. No longer do you have to choose between viewing anatomical structures and identifying material composition. You can, for example, adjust the monoenergetic level or get Z-effective maps.

**“Our Philips spectral-detector CT allows us to acquire conventional and spectral data in one scan, with no change in our current workflow.” – Dr. Charles White, Professor of Pulmonary and Critical Care Medicine, University of**



### Maryland School of Medicine

The Philips IQon Spectral CT is the world's first and only detector-based spectral CT, delivering multiple layers of retrospective data in a single, low-dose scan. Fully integrated with your current workflow, this proprietary approach to CT delivers extraordinary diagnostic quality,

empowering you to improve your clinical confidence and make the right diagnosis in the first scan.

- To learn more about the difference which Philips detector based spectral CT can make visit: <https://www.philips.ae/healthcare/resources/landing/spectral-detector-ct>



## Ziehm Imaging offers enhanced mobile imaging solution for cardiovascular procedures



Globally, the ageing population, the rising burden of chronic conditions and cardiovascular diseases are considered as the leading causes of morbidity. This has led to an increasing number of interventional procedures which in turn has increased pressure on OR capacity. As such, the efficient and safe execution of these procedures is becoming ever more important.

The intraoperative use of advanced mobile imaging systems addresses this challenge. By improving clinical outcomes, revision surgery rates can be lowered significantly and overall health expenditures reduced. The use of mobile C-arms opens new clinical pathways and lower purchase and installation costs, thus offering a faster return on investment than with fixed installed angiography systems.

### Hybrid OR

Ziehm Imaging's powerful mobile C-arm – Ziehm Vision RFD Hybrid Edition – is designed to successfully perform during highly demanding interventional endovascular procedures. To ensure consistent system temperature and prevent system failure due to overheating, it is equipped with Advanced Active Cooling. Unique to the market, the system provides motorization of all four axes for easy control directly from the sterile field.

It offers all the qualities needed to instantly convert conventional ORs into hybrid rooms. With versatile viewing options, ceiling-mounted monitors, wireless solutions and a unique Usability Concept it requires no modifications to the

OR. Connectivity options to 3D vascular navigation systems and contrast injectors make this system ideal for challenging hybrid interventions such as TAVI angioplasties and EVAR.

Software features such as Enhanced Vessel Visualization, with its automatic colour display of vessels, help to precisely define the vessel outlines and the side branches. This eases communication in the OR.

In addition, navigation plays an increasingly important role. Ziehm Imaging and their daughter company Therenva address the field of intraoperative 3D endovascular navigation with their mobile image fusion system EndoNaut.

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# MiniCollect provides gentle way to collect small samples of capillary blood

The capillary blood sample is becoming increasingly popular as specimen material due to its simpler and less invasive sampling procedure. One of the advantages is the low blood volume. Small quantities are sufficient to enable a variety of parameters to be tested.

Capillary blood collection supports the Patient Blood Management approach: as little blood as possible, as much as necessary. If for some reason venous blood collection is not possible, capillary blood collection could be a promising alternative. For children and patients who require frequent sampling it is essential that the volume of blood collected is minimized.



The MiniCollect® Capillary Blood Collection System is perfectly suited for young children, geriatric patients as well as patients with fragile veins. MiniCollect® is also recommended in situations where venous blood collection proves particularly difficult or contra-

indicated. For delicate vein conditions, patients who often have blood samples taken, or people with severe burns, capillary blood collection with the MiniCollect® system offers a great alternative to venous blood collection.

The MiniCollect® tube includes an integrated scoop, allowing droplets of blood to be collected easily and hygienically. The additional use of a capillary or funnel is not needed.

- wide opening of the tube ensures an efficient blood flow
- increased diameter facilitates the mixing of the sample
- minimises adhesion to the wall of the tube
- transparent labels and colour-coded caps
- transport-safe cap
- improved cap design: easier opening thanks to better grip

Greiner Bio-One offers a complete product range for capillary blood collection



- MiniCollect® Blood Collection Tubes or MiniCollect® Complete version (blood collection tubes pre-assembled in a carrier tube)
- MiniCollect® Safety Lancets
- MiniCollect® Accessories

## MiniCollect® meets carrier tube

MiniCollect® tubes can be inserted into a PREMIUM

carrier tube. This combination corresponds to the dimensions of a standard 13 x 75mm tube. With the MiniCollect® Complete version, which is already irreversibly assembled with the carrier tube, the advantages – particularly for automated analysis of the sample – are numerous.

The standardized tube size enables identification with standard tube label formats. MiniCollect® tubes in combination with carrier tubes can be processed in a standard centrifuge. The tubes have a pierceable cap whilst still closed and remain leakproof. It is not necessary to remove the cap before analysis, thus keeping the process simple and hygienic.

## Automation Suitable for automatic processing

On many analysis instruments, both venous and capillary blood samples can be analyzed in the same way.

## No extra step before analysis

MiniCollect® Complete tubes are CLSI AUTO1-A-compliant. The tubes fit into 13 x 75 mm racks and are suitable for automated processing in the laboratory.

## Validated on many lab instruments

MiniCollect® Complete tubes are validated on multiple lab instruments.


## Wide range of safety lancets



The MiniCollect® lancets are available with a wide range of puncture depths and blade sizes / needle gauges to ensure that the puncture wound can be kept as small as possible while achieving the targeted sample volume.

The safety mechanism ensures that the blade / needle is automatically retracted after the puncture and is safely enclosed within the plastic housing. In particular when dealing with our youngest patients, it is imperative that the procedure be as gentle as possible to avoid causing unnecessary anxiety.

The safety mechanism means that the blade / needle is hidden from view, allowing the blood collection to take place in a more relaxed atmosphere for all concerned.

- More information on our website [www.gbo.com](http://www.gbo.com) 





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# First human use of high-bandwidth wireless brain-computer interface

Brain-computer interfaces (BCIs) are an emerging assistive technology, enabling people with paralysis to type on computer screens or manipulate robotic prostheses just by thinking about moving their own bodies. For years, investigational BCIs used in clinical trials have required cables to connect the sensing array in the brain to computers that decode the signals and use them to drive external devices.

Now, for the first time, BrainGate clinical trial participants with tetraplegia have demonstrated use of an intracortical wireless BCI with an external wireless transmitter. The system is capable of transmitting brain signals at single-neuron resolution and in full broadband fidelity without physically tethering the user to a decoding system. The traditional cables are replaced by a small transmitter about 2 inches in its largest dimension and weighing a little over 1.5 ounces. The unit sits on top of a user's head and connects to an electrode array within the brain's motor cortex using the same port used by wired systems.

For a study published in *IEEE Transactions on Biomedical Engineering*, two clinical trial participants with paralysis used the BrainGate system with a wireless transmitter to point, click and type on a standard tablet computer. The study showed that the wireless system transmitted signals with virtually the same fidelity as wired systems, and participants achieved similar point-and-click accuracy and typing speeds.

## Same decoding algorithms

"We've demonstrated that this wireless system is functionally equivalent to the wired systems that have been the gold standard in BCI performance for years," said John Simeral, an assistant professor of engineering (research) at Brown University, a member of the BrainGate research consortium and the study's lead author. "The signals are recorded and transmitted with appropriately similar fidelity, which means we can use the same decoding algorithms we used with wired equipment. The only difference is that people no longer need to



be physically tethered to our equipment, which opens up new possibilities in terms of how the system can be used."

The researchers say the study represents an early but important step toward a major objective in BCI research: a fully implantable intracortical system that aids in restoring independence for people who have lost the ability to move. While wireless devices with lower bandwidth have been reported previously, this is the first device to transmit the full spectrum of signals recorded by an intracortical sensor. That high-broadband wireless signal enables clinical research and basic human neuroscience that is much more difficult to perform with wired BCIs.

## New possibilities

The new study demonstrated some of those new possibilities. The trial participants – a 35-year-old man and a 63-year-old man, both paralyzed by spinal cord injuries – were able to use the system in their homes, as opposed to the lab setting where most BCI research takes place. Unencumbered by cables, the participants were able to use the BCI continuously for up to 24 hours, giving the researchers long-duration data including while participants slept.

"We want to understand how neural signals evolve over time," said Leigh Hochberg, an engineering professor at Brown, a researcher at Brown's Carney Institute for Brain Science and leader of the BrainGate clinical trial. "With this system, we're able to look at brain activity, at home, over long periods in a way that was nearly impossible before. This will help us to design decoding algorithms that provide for the seamless, intuitive, reliable restoration of communication and mobility for people with paralysis."

The device used in the study was first developed at Brown in the lab of Arto Nurmikko, a professor in Brown's School of Engineering. Dubbed the Brown Wireless Device (BWD), it was designed to transmit high-fidelity signals while drawing minimal power. In the current study, two devices used together recorded neural signals at 48 megabits per second from 200 electrodes with a battery life of over 36 hours.

While the BWD has been used successfully for several years in basic neuroscience research, additional testing and regulatory permission were required prior to using the system in the BrainGate trial. Nurmikko says the step to human use marks a key moment in the development of BCI technology. MEH

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