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War child

Paediatric pain management manual to help clinicians in conflict zones

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Prognosis

Children of war

In the shadows of war, children suffer silently. One in six children worldwide live in conflict zones, facing not only the immediate dangers of violence but also the long-term consequences of inadequate medical care. The announcement of a new Paediatric Trauma Pain Management Manual by the World Innovation Summit for Health (WISH) – a global health initiative of Qatar Foundation – shines a crucial light on an often-overlooked aspect of wartime healthcare: paediatric pain management.

Children in conflict zones are uniquely vulnerable. Their developing bodies sustain more severe injuries from blast events, and they face higher mortality rates than adults. Yet, until now, comprehensive guidance for treating paediatric blast injuries has been notably absent. This gap in care isn't just a medical oversight; it's a moral failing that can lead to lifelong physical, psychological, and social consequences for young survivors.

The manual's development, led by experts from diverse backgrounds, including clinicians with firsthand experience in conflict zones, represents a significant step forward. By providing specialized guidance on pain management throughout the care continuum, from initial injury to long-term follow-up, this resource has the potential to transform outcomes for many young patients.

However, the creation of this manual also serves as a stark reminder of the horrific realities faced by children in war-torn regions. No child should require a specialized manual for blast injuries. The international community must redouble its efforts to protect children from the ravages of war and to uphold their right to safety and health.

While we commend the developers of this manual for their vital work, we must also recognize that it is a response to a failure of global proportions. The need for such a resource underscores the urgent necessity for conflict resolution, increased humanitarian aid, and stronger international laws protecting children in conflict zones.

Callan Emery
Editor
editor@MiddleEastHealth.com

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Publisher
Michael Hurst
Michael@MiddleEastHealth.com

Editor
Callan Emery
editor@MiddleEastHealth.com

Editorial Consultants
Dr Gamal Hammad, Dr Peter Moore, Harry Brewer

Middle East Editorial Office
PO Box 72280, Dubai, UAE
Telephone: (+9714) 391 4775
editor@MiddleEastHealth.com

Marketing Manager
Foehn Sarkar
Telephone: (+9714) 391 4775 ▮ Fax: (+9714) 391 4888
marketing@MiddleEastHealth.com

Subscription & Admin Manager
Savita Kapoor
Telephone: (+9714) 391 4775 ▮ Fax: (+9714) 391 4888
Savita@MiddleEastHealth.com

Advertising Sales
PO Box 72280, Dubai, UAE
marketing@MiddleEastHealth.com

Americas, France
Joy Sarkar
P O Box 72280, Building No.2
2nd Floor, Dubai Media City
Dubai, United Arab Emirates
Tel: +971 4 391 4775 Fax: +971 4 391 4888
Joy@MiddleEastHealth.com

Japan
Mr Katsuhiro Ishii
Ace Media Service Inc
12-6, 4-chome, Adachi-ku, Tokyo 121-0824, Japan
Tel: +81-3-5691-3335 ▮ Fax:+81-3-5691-3336
Email: *amskatsu@dream.com*

China
Miss Li Ying
Medic Time Development Ltd,
Flat 1907, Tower A, Haisong Building, Tairan 9th Road,
Futian District, Shenzhen, China 518048
Tel: +86-755-239 812 21 ▮ Fax: +86-755-239 812 33
Email: *medic8@medictime.com*

Taiwan
Larry Wang
Olympia Global Co Ltd
7F, No.35, Sec 3, Shenyang Rd, Taichung
Taiwan 40651 ▮ P O Box: 46-283 Taichung Taiwan 40799
Tel: +886- (4)-22429845 ▮ Fax:+886- (4)-23587689
Email: *media.news@msa.hinet.net*

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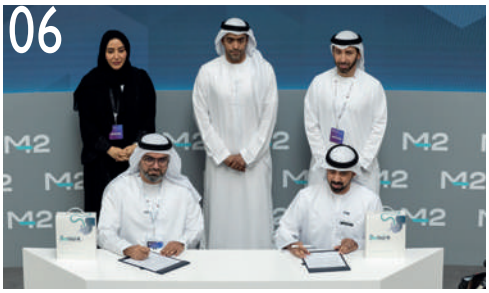

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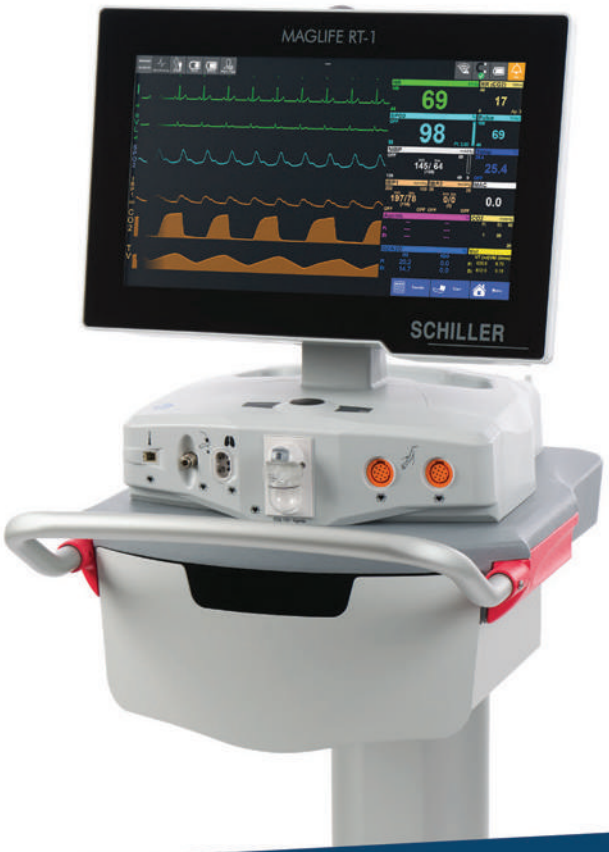

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Update from around the region

Abu Dhabi launches groundbreaking biobank initiative

The Department of Health – Abu Dhabi (DoH) and M42 have unveiled the Abu Dhabi Biobank, featuring the region's largest hybrid cord blood bank. It aims to bolster the emirate's position as a leading destination for life sciences and address critical healthcare challenges.

At the heart of this initiative is a state-of-the-art cord blood banking facility, capable of storing 100,000 cord blood samples. This resource promises to significantly impact the treatment of haematological and immune system disorders, including leukaemia, lymphoma, and bone marrow diseases requiring transplantation.

Enhancing research and therapeutic capabilities

The biobank's ambitious scope extends beyond cord blood storage. With a capacity to house five million pan-human samples, it aims to create a diverse dataset that can facilitate better-matched haematopoietic stem cell provision globally. This comprehensive approach is designed to support therapeutic treatments, life science research for medical innovation, novel drug discovery targets, and disease prevention.

The facility, located in M42's Omics Centre of Excellence, boasts cutting-edge automated technology and large-capacity biobanking infrastructure. Samples will be preserved for up to 30 years, ensuring long-term viability for both research and therapeutic applications.

Ashish Koshy, Group Chief Operating Officer at M42, emphasised the biobank's potential impact: "The Abu Dhabi Biobank will foster global innovation in therapy development, as it holds huge potential for regenerative medicine, aiding in rare disease treatment, genetic screening, early detection, and scientific research."

Collaborative effort across healthcare entities

The initiative will be implemented across four leading maternal and child health facilities in Abu Dhabi: Danat Al Emarat Hospital for Women & Children (part of the M42 group), Corniche Hospital, Kanad Hospital, and hospitals within the NMC Healthcare network.

Expectant mothers will have the option to preserve their newborn's stem cells through a safe, painless, and non-intrusive process. This service will be available for both public and private banking, offering families the opportunity to contribute to this groundbreaking programme. MEH

SEHA unveils new brand identity, focusing on patient-centric care

The Abu Dhabi Health Services Company (SEHA), a subsidiary of PureHealth, has launched a new brand identity aimed at enhancing patient experience across its network of over 14 hospitals in Abu Dhabi. The rebranding, unveiled during Abu Dhabi Global Healthcare Week, signifies SEHA's commitment to providing personalised, high-quality healthcare.

SEHA's renewed focus aligns with PureHealth's vision of improving life spans and quality of life. Shaista Asif, Group Chief Executive Officer of PureHealth, commented: "Essential to PureHealth's mission to achieve longer, healthier, and happier lives for people in the UAE and beyond is the continuous reaffirmation of our commitment to patient outcomes and an unparalleled patient experience across our entire network."

Technological advancements in emergency care

As part of its commitment to excellence, SEHA has introduced state-of-the-art emergency rooms at Sheikh Khalifa Medical City (SKMC) and Tawam Hospital. These facilities are equipped with cutting-edge medical technology and staffed by highly qualified emergency care professionals, aiming to reduce waiting times and improve patient intake capabilities.

Specialised paediatric services

SKMC has also opened a dedicated paediatric emergency room, designed specifically for young patients. This facility is equipped with

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specialised paediatric medical equipment and staffed by experts in paediatric emergency medicine, ensuring that children receive care in an environment tailored to their needs.

Improved accessibility

To enhance accessibility, SEHA has introduced appointment booking via WhatsApp and extended clinic hours to evenings and weekends at several locations. These initiatives are designed to accommodate patients' diverse needs and provide flexible healthcare solutions outside traditional working hours.

Through these improvements and its ongoing public health campaigns, SEHA continues to demonstrate its commitment to advancing community health and promoting wellness across Abu Dhabi. MEH

Dubai Health partners with Angelman Syndrome Foundation to establish GCC's first dedicated clinic

Dubai Health, the first integrated academic health system in Dubai, has joined forces with the Angelman Syndrome Foundation to launch the Gulf Cooperation Council's (GCC) first dedicated clinic for Angelman syndrome at Al Jalila Children's Hospital. This groundbreaking initiative aims to enhance care for patients with this rare neurological disorder and increase awareness among medical professionals.

The clinic will serve as a centralised hub for patients, families, and caregivers to access specialist healthcare professionals and evidence-based care. This development is particularly significant given the rarity of Angelman syndrome, which affects approximately one in 500,000 people worldwide.

Dr Abdulla Al Khayat, CEO of Al Jalila Children's Hospital, commented: "This crucial partnership is a beacon of hope for patients and families affected by this rare condition. By ensuring that we deliver the highest standard of care and driven by our Patient First promise, we hope to empower Angelman Syndrome patients and their families to lead fulfilling lives."

Clinical presentation and genetics

Angelman syndrome is characterised by significant developmental delays, particularly in motor skills and speech. Patients typically present with:

- Delayed walking and balance issues by 12 months of age
- Seizures
- Absent speech
- An apparent happy demeanour with frequent laughter and excitability

The condition is caused by a loss of function in the maternal UBE3A gene on chromosome 15. It shares some symptomatic overlap with autism, cerebral palsy, and Prader-Willi syndrome, potentially complicating diagnosis.

Advancing research and treatment

Through Dubai Health's integrated academic health system, the clinic aims to enhance future treatment options by leveraging ongoing education and research initiatives. This collaborative effort seeks to address the current lack of curative treatments, focusing instead on managing associated clinical findings.

Amanda Moore, CEO of the Angelman Syndrome Foundation, commented: "This clinic will offer families in the UAE access to professionals with deep knowledge of Angelman Syndrome, expertise that has traditionally been challenging to locate. Raising awareness of rare conditions like Angelman Syndrome is crucial for early diagnosis and better patient outcomes." MEH

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RCSI Bahrain announces $45M campus expansion on 20th anniversary

The Royal College of Surgeons in Ireland - Medical University of Bahrain (RCSI Bahrain) has unveiled plans for a significant campus expansion project valued at US$45 million, coinciding with its 20th anniversary in the kingdom. The expansion aims to enhance the university's capacity for advanced medical education and research.

The centrepiece of the expansion is a new state-of-the-art academic building that will add 7,912 square metres of usable space. This facility will house enhanced teaching areas, cutting-edge research laboratories, a modern library, social spaces, and a spacious event hall. The design prioritises sustainability, incorporating features such as solar panels, LED lighting, and water conservation systems.

RCSI Bahrain has recently signed an agreement with Nass Corporation for the construction of this ambitious project. The expansion is set to address the growing demand for advanced medical education and research facilities in the region.

Focus on interdisciplinary and patient-centred research

Since its establishment, RCSI Bahrain has consistently achieved significant milestones, with a particular emphasis on innovative research. The university's School of Postgraduate Studies and Research focuses on interdisciplinary clinical and patient-centred research, addressing key national, regional, and global health challenges.

Professor Sameer Otoom, President of RCSI Medical University of Bahrain, highlighted the institution's achievements: "As we celebrate our 20th anniversary in Bahrain, we are proud to celebrate this milestone, boasting a diverse network of over 3,000 alumni and healthcare professionals from 56 nationalities comprising 459 doctors and 1,321 nurses, which have significantly contributed to strengthening Bahrain's comprehensive healthcare system."

Economic impact and workforce development

A recent National Economic Contribution Report by PwC Ireland estimated RCSI Bahrain's annual contribution to the national economy at USD 91 million. This figure encompasses the university's operations, facilities, equipment, student expenditures, and the economic impact of visiting friends and relatives of international students.

The upcoming construction and outfitting of the new academic building is projected to inject an additional US$102 million into the economy over a four-year period. Moreover, RCSI Bahrain's activities directly and indirectly support 437 jobs in the community.

RCSI Bahrain plays a crucial role in Bahrain's socio-economic development by initiating programmes to enhance the skills of the local healthcare workforce. The university employs 227 full-time staff members, with 50% being Bahraini nationals who benefit from extensive continuous professional development programmes.

Alignment with Bahrain's healthcare vision

The expansion project aligns with Bahrain's vision to establish itself as a leading regional hub for healthcare and education. Munther Almudawi, Executive Director of Business Development for Healthcare, Education, and Tourism at Bahrain EDB, commented on the project's significance: "We take pride in RCSI Bahrain's 20 years of milestone successes on the island and look forward to witnessing the development of its sustainably-led campus expansion project, which will add value to the diversity of Bahrain's highly-developed education and healthcare ecosystems and aims to provide service quality on par with the global playing field." MEH

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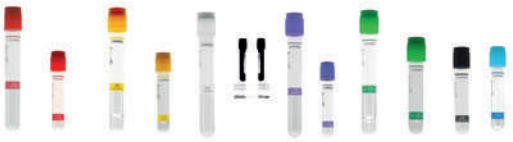

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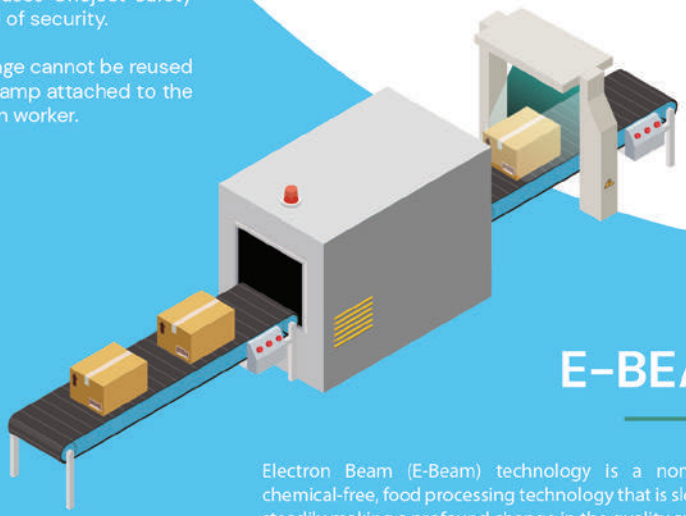

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Interview

DynamX bioadaptor: Revolutionizing coronary stents with 'uncaging' technology

The DynamX bioadaptor represents a breakthrough in coronary stent implant technology. In this interview, *Callan Emery* speaks to Dr Mirvat Alasnag, MD, Head of the Catheterization Laboratory, King Fahd Armed Forces Hospital, KSA about this innovative device, which differs from traditional stents by "uncaging" the treated vessel after an initial healing period. The interview explores the DynamX bioadaptor's unique design, mechanism of action, clinical data, and potential to improve long-term outcomes for patients with coronary artery disease.

***Calllan Emery*: Can you briefly explain what the DynamX bioadaptor is and how the stent's design and mechanism of action differ from traditional drug-eluting stents or bare-metal stents?**

● **Dr Mirvat Alasnag:** The DynamX™ bioadaptor is the first coronary implant technology with a unique mechanism of unlocking the bioadaptor frame after polymer resorption over 6 months, uncaging the vessel while maintaining dynamic support to the vessel. It aims to achieve the acute performance of drug-eluting stents (DES) with the advantages of restoration of vessel function.

It consists of three thin metal alloy helical strands held together temporarily by a bioabsorbable coating to provide strength when opening an artery blockage. Unlike traditional stents, after the period of healing and coating resorption in the first six months, the bioadaptor unlocks and the helical strands separate, thereby restoring hemodynamic modulation of the vessel and establishing more natural and dynamic support of artery motion and function.

The bioadaptor can also expand slowly over time along with the artery in order to maintain good blood flow.[1] Recent findings also show stabilization and even shrinking of plaque volume in arteries treated with the bioadaptor.[2]

***CE*: How many of these stents have you implanted and are you involved in any clinical study of this stent?**

● **MA:** So far, we have used it in a dozen patients with varying pathologies and presentations including ACS [acute coronary syndrome], STEMI [ST-elevation myocardial infarction], and CCS [chronic coronary syndrome or stable ischemic heart disease]. We are currently recruiting for the BioRestore trial.

***CE*: Can you explain how the unique "uncaging" mechanism of the DynamX device works after the polymer resorbs over 6 months? What are the potential advantages of this "uncaging" mechanism?**

● **MA:** The DynamX bioadaptor is a metal (cobalt-chromium) implant with a drug-eluting bioresorbable polymer that supports the coronary artery during healing, with radial strength similar to drug-eluting stents. Though it initially functions like a traditional drug-eluting stent while the coronary artery heals (~3 months). Resorption of the basecoat polymer (similar to dissolving sutures) on the DynamX bioadaptor is designed to naturally resorb over 6 months. This enables the helical strands to unlock and separate while maintaining the established blood flow lumen, and growth of functional muscle cells around the struts. This allows the bioadaptor to unlock and the vessel to uncage, thus permitting the artery to move and function more naturally in response to the heart's hemodynamic needs (such as during exercise). This unique mechanism of action has also been shown to restore (a) the ability for positive adaptive remodelling, (b) vessel function such as pulsatility and vasomotion, and (c) allow for the vessel's return towards baseline angulation.

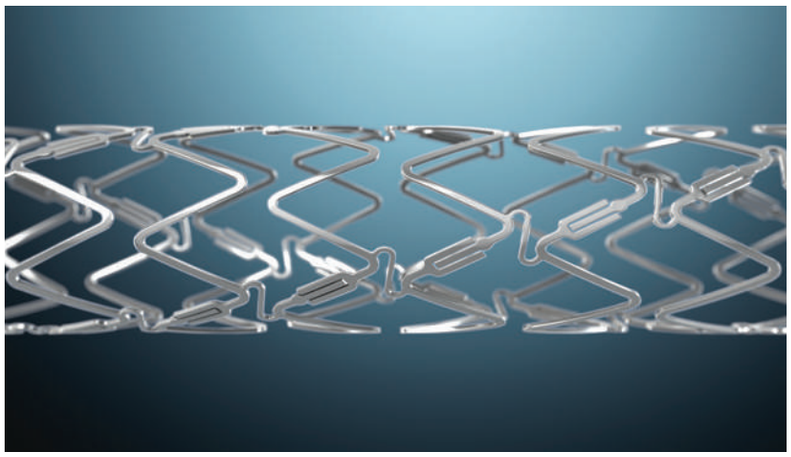
Dr Mirvat Alasnag, MD, Head of the Catheterization Laboratory, King Fahd Armed Forces Hospital, KSA

Results of a randomized controlled trial also showed significant reduction in target lesion failure and target vessel failure compared to a third generation DES out to 2 years. The patency of treated vessels were also significantly greater for DynamX bioadaptor with the difference in late lumen loss and percentage diameter stenosis reaching statistical significance.

Drug-eluting stents cage the coronary arteries and prevent a return to more natural motion and function, precluding natural hemodynamic modulation.

***CE*: Are there any specific patient populations that may particularly benefit from this stent technology? Are there any contraindications?**

● **MA:** This is a very good question. While the clinical data shows effectiveness and safety across the patient population and vessel types, the data shows par-



The DynamX bioadaptor stent

ticularly differentiated superiority for the LAD [left anterior descending artery]. It is not too surprising considering that the LAD is a very long vessel that experiences a lot of motion with every heartbeat. In fact, a study by a team at the University of Chicago, Illinois showed that the proximal and distal ends of the LAD often rotate in different directions.

Another patient population that could benefit greatly are younger patients. The idea with restoration of more natural artery motion, function, and ultimately blood flow, is to flatten the major adverse cardiac event (MACE) curve. With the stent-related MACE rate well documented at 2-3% growth annually without plateau, you can imagine the tremendous risk these patients face in their lifetimes for revascularization, hospitalization, and even cardiac-related death.

Finally, patients who seek to reclaim an active lifestyle may also benefit from the restoration of vessel pulsatility and hemodynamic modulation that results from the device's unique unlocking mechanism of action.

CE: How does the deployment procedure for the DynamX stent differ, if at all, from implanting a traditional stent?

- **MA:** The deployment procedure for the DynamX bioadaptor is no different from that of a traditional drug-eluting stent.

CE: What clinical data or trials have evaluated the performance and efficacy of the DynamX stent so far? How does it compare to current gold-standard stents?

- **MA:** The latest data on DynamX was presented at a late-breaking clinical session during the EuroPCR 2024 conference in Paris. This was based on the two-year results from the BIOADAPTOR Randomized Controlled (1:1) Trial (RCT), comparing the DynamX bioadaptor system to standard of care Resolute OnyxTM Drug-Eluting Stent from 34 centres in Japan, Europe, and New Zealand. The results, for the first time, demonstrate significant reduction in adverse events and clinical advantage of the DynamX bioadaptor in target lesion failure (TLF) and secondary endpoint of target vessel failure (TVF) driven by sustained low event rates with DynamX compared to a two-fold increase in DES.

An earlier, single-arm, open-label mechanistic study included imaging analysis and first confirmed restoration of vessel function and motion. It is notable that there were zero deaths attributed to the device or procedure and zero definite/probable stent thrombosis out to the final 3-year follow up period.

CE: What are the potential risks or complications associated with the use of this stent, and how do they compare to the risks of other stent types?

- **MA:** The potential peri-procedural risks at first seem similar to drug-eluting stents, but as I mentioned earlier, the clinical outcomes are different between the technologies. The outcomes of the randomized controlled trial already show a flattening of the TLF curve for DynamX from 1 year to 2 years (1.8% to 2.3%) while it continues to rise linearly as expected for the comparative drug-eluting stent (2.8% to 5.5%).

CE: How does the DynamX bioadaptor stent's design address the issue of late stent thrombosis, which can be a concern with some stent types?

- **MA:** The unique design of the DynamX bioadaptor allows for restoration of more natural vessel motion and function as observed in the restoration of arterial pulsatility and motion. This allows for more natural blood flow in the uncaged artery, not only in the treated segment but also proximal and distal to it, and decreased risk of the factors that can lead to late thrombotic events.

I also want to clarify that this device, the DynamX bioadaptor, is very different from bioresorbable scaffold (BRS) devices. BRS were plagued by late stent thrombosis rates that were significantly worse than for DES. This was driven by several factors including thick struts, malapposition, and long resorption times. The DynamX bioadaptor is comprised of thin (71µm) struts that are implanted similarly to DES. The helical strands unlock and separate at 6 months and are safely embedded in healthy, functioning neointima just like DES (98% strut coverage at 12 months).

CE: What kind of long-term follow-up or monitoring is recommended for patients receiving this type of dynamic stent?

- **MA:** The follow up is per our standard protocol for all patients with CAD to optimize ASCVD risk factors and determine duration of DAPT [dual-antiplatelet therapy]. Those enrolled in the BioRestore trial obviously have the follow up per protocol for a total of 12 months and assessing clinical endpoints of TLF; cardiovascular death, target vessel myocardial infarction, clinically indicated target lesion revascularization (CITLR), per ARC-2.

CE: What are the potential implications of this technology for improving long-term outcomes and quality of life for patients undergoing coronary stenting procedures?

- **MA:** The great long-term potential of the DynamX bioadaptor is to flatten and lower the MACE curve over the patient's lifetime. The unique restoration of vessel motion and function also allows for improved blood flow in response to cardiac exertion, so patients may experience less symptoms of their cardiac disease, engage in more of the activities they enjoy and carry less of their constant anxiety burden. MEH

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2 Saito, S, et al. First randomised controlled trial comparing the sirolimus-eluting bioadaptor with the zotarolimus-eluting drug-eluting stent in patients with de novo coronary arty lesions: 12-month clinical and imaging data from the multi-centre, international, BIOADAPTOR-RCT. *The Lancet* Nov 2023; 1-13.

Increasing illness in the UAE: A growing concern

Summary

The UAE has seen a notable rise in diseases and mental illnesses typically linked to the Western world, now recognized by the World Health Organization (WHO) as epidemic. These include Alzheimer's, Parkinson's, respiratory illnesses, diabetes, and chronic fatigue. There is a confirmed link between illness, inflammatory response, and DNA, with triggers measurable both inside and outside the body. Changes in construction, regulations, and the use of biocides significantly impact occupants' health. Advances in diagnosis and measurement have revolutionized medical care and treatment, and this paper explores some issues and solutions.

Building-related illnesses causation and challenges

The rise in medical conditions can often be identified by conventional medicine, but treatment is hampered when exposure to triggers remains. Identifying and reducing these triggers is crucial. Despite debates about cause and effect, data confirms that "Building related illness" is now central to risk management and treatment. Rapid construction in the UAE using lightweight materials has led to a misconception that conventional fitting out and engineering practices are adequate.

Current failures in diagnosis and treatment

The broad spectrum of illnesses is often misdiagnosed. The WHO acknowledges that treatment is complicated by the intricate interplay between biological and chemical exposures, individual genetic differences, and immune responses. This complexity often leads to delays in accurate diagnosis and effective treatment. The WHO now states that 20% of the world's population with specific HLA genes are at risk of these health risks.

Objective of the survey and investigation

The objective of the Building Forensics survey is to directly support the client and their medical team in assessing possible, probable, and identifiable triggers associated with building-related illness.

Warning signs and symptoms

New and early warning symptoms such as fatigue, brain fog, IBS, gynaecological changes, hair loss, weight gain, and skin issues are typical markers of building-related illnesses. Building Forensics provides clients with a checklist of symptoms and over 30 possible triggers.

Environmental Hygienist's role

Environmental Hygienists support medical practitioners by identifying contaminants, assessing risks, and providing actionable data. They conduct detailed environmental surveys, including infrared scanning, moisture content measurement, and biological assessments. These surveys identify defects, damage, and contaminants such as bacteria, mold, VOCs, mycotoxins, and particulate matter. The data is formed from technology such as Next Generation Sequencing, DNA-PCR analysis, LS-MS-MS and often comparison measurement. This data is followed with conclusions and recommendations on causation and risk reduction.

Protocols and data utilization

Building Forensics offers leading-edge services to identify contamination and provide actionable data, focusing on occupant exposure routes and toxic load. Their process includes health interviews, environmental surveys, and detailed analysis of both surface and airborne contaminants. Building Forensics can utilize information provided by the medical team regarding possible presence of inflammagens or toxins or assist with information.

Data-driven diagnosis

Advancements in lab techniques now allow medical professionals to make informed diagnoses based on data, linking symptoms to exposure routes. This scientific approach is crucial for identifying and mitigating risks and hazards present in homes and buildings. This can be as simple as confirming toxins inside the body are present in the environment or following a risk reduction protocol by identifying and reducing or removing triggers.

When to consider building forensics services

Historically, our clients have health issues that don't appear to respond to treatment or they just monitor their environment and health. Our engagement is usually through a healthcare provider who utilizes our data to identify the potential presence of inflammagens identified in the home environment. Many contributing contamination factors can limit the effectiveness of treatment, and these must be reduced or removed to improve treatment efficacy. Increasingly, our clients recognize the health risk in modern construction and engage Building Forensics to assess and monitor indoor environmental conditions.

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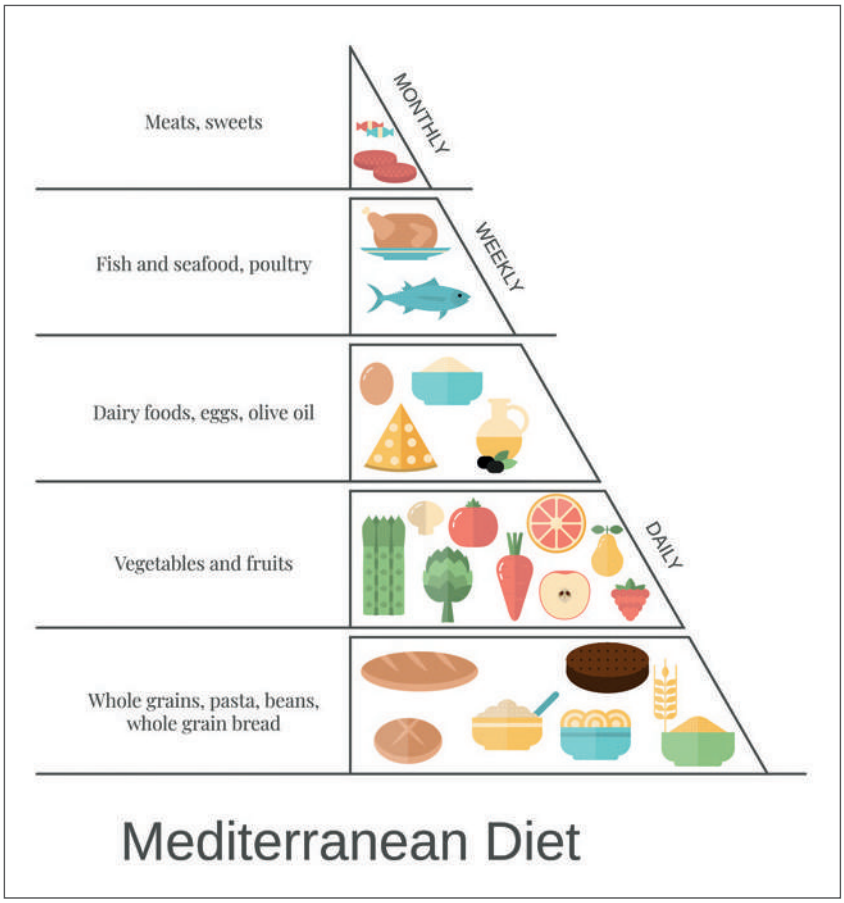
Mediterranean diet boosts survival rates in cancer patients

A landmark Italian study reveals that cancer survivors adhering to a Mediterranean diet experience significantly reduced mortality risks, particularly from cardiovascular causes.

The Mediterranean diet, long celebrated for its health benefits, has now been shown to offer substantial advantages even after a cancer diagnosis. New research from Italy demonstrates that individuals with a history of cancer who closely follow this dietary pattern have a markedly improved survival rate compared to those who do not.



The study

The groundbreaking research, conducted as part of the UMBERTO Project, was a collaborative effort between the Joint Research Platform Umberto Veronesi Foundation and the Department of Epidemiology and Prevention at the I.R.C.C.S. Neuromed of Pozzilli, in partnership with the LUM "Giuseppe Degennaro" University of Casamassima.

Published in *JACC CardioOncology*[1], the study examined 800 Italian adults who had been diagnosed with cancer prior to their enrolment in the Moli-sani Study between 2005 and 2010. Participants, including both men and women, were followed for over 13 years. Detailed dietary information for the year preceding enrolment was available for all subjects.

Key findings

The results were striking. Individuals who reported high adherence to a Mediterranean diet in the year before joining the study demonstrated a 32% lower risk of mortality compared to those who did not follow the diet. Perhaps most notably, the benefit was particularly pronounced for cardiovascular mortality, which saw a remarkable 60% reduction.

Marialaura Bonaccio, first author of the study and Co-Principal Investigator of the Joint Research Platform at the Department of Epidemiology and Prevention of the IRCCS Neuromed, commented on the significance of these findings: "The beneficial role of the Mediterranean Diet in primary prevention of some tumours is well known in the literature. However, little is known about the potential benefits that this dietary model can have for those who have already received a cancer diagnosis".

Implications for cancer survivors

With the number of cancer survivors expected to rise in coming years, potentially due to increasingly targeted and effective therapies, understanding the impact of diet on long-term survival becomes crucial.

The study's results suggest that adopting a Mediterranean diet could be a powerful intervention for improving outcomes in cancer survivors. This dietary pattern, rich in fruits, vegetables, olive oil, and other plant-based foods, may offer protective effects that extend beyond cancer prevention to post-diagnosis care.

Molecular mechanisms and the 'common soil' hypothesis

The research also lends support to an intriguing hypothesis about the shared origins of chronic diseases. Maria Benedetta Donati, Principal Investigator of the Joint Platform, explained: "These data support an interesting hypothesis that different chronic diseases, such as tumours and

Soy-rich diets may boost cognitive function in school-aged children, study finds

New research suggests that higher consumption of soy isoflavones may enhance thinking abilities and attention in school-aged children, potentially opening avenues for future investigations into the cognitive benefits of soy-based foods for young minds.

A recent study has uncovered a potential link between the consumption of soy isoflavones and improved cognitive function in children aged 7 to 13. The research, which was presented at the American Society for Nutrition's NUTRITION 2024 conference in Chicago, provides compelling evidence for the inclusion of soy-based foods in children's diets to support cognitive development.

The cross-sectional study analysed data from 128 children, utilising 7-day diet records to calculate average dietary intake, including isoflavone consumption. Cognitive assessments were conducted using grade-adjusted pencil and paper tests for general intellectual ability, whilst attentional abilities were measured using a computerised flanker task with concurrent electroencephalographic (EEG) recording.

Ajla Bristina, a neuroscience doctoral student at the University of Illinois Urbana-Champaign and lead researcher, highlighted the novelty of their approach, noting: "No other studies have examined the association between soy isoflavones and attentional abilities using EEG or similar measures to record electrical activity generated by the brain."

The results revealed that children who consumed more soy foods demonstrated faster responses during attentional tasks and exhibited quicker processing speeds. However, no significant association was found between soy isoflavone intake and general intellectual ability.

Low soy consumption amongst participants

Despite the positive findings, the study revealed that the children generally consumed low amounts of isoflavone-containing soy foods. Bristina noted: "The children in our study consumed an average of 1.33 mg of isoflavones per day, which while relatively low, aligns with previously reported values for the United States."

To contextualise this intake, Bristina provided comparisons to common soy-based foods: "An 8 fl. oz serving of soy milk provides about 28 mg of isoflavones, a serving of tofu provides about 35 mg and half a cup of steamed edamame provides about 18 mg of isoflavones."

Whilst these findings are promising, Bristina cautioned that correlational studies are only the initial step. "To better understand the effects of eating soy foods on children's cognitive abilities and the precise amount of isoflavone intake necessary to elicit faster response times will require intervention approaches," she said.

To address these questions, the research team has initiated a clinical trial investigating the effects of soy foods on cognitive abilities, sex hormones, metabolic health, and gut health.

Incorporating soy into children's diets

The researchers suggest that parents interested in increasing their children's soy intake could consider incorporating soy-based snacks such as roasted edamame, soynuts, or soy milk into their diets. For meals, tofu, tempeh, or soy-based nuggets were recommended as suitable options. MEH

heart diseases, actually share the same molecular mechanisms. This is known in the literature as 'common soil', namely a common ground from which these two groups of disorders originate."

The role of antioxidants

Chiara Tonelli, President of the Scientific Committee of the Umberto Veronesi Foundation, highlighted the potential mechanisms behind the observed benefits: "The Mediterranean Diet is mostly composed of foods such as fruit, vegetables and olive oil, that are natural sources of antioxidant compounds, which could explain the advantage observed in terms of mortality not only from cancer, but also from cardiovascular diseases, that can be reduced by diets particularly rich in these bioactive compounds".

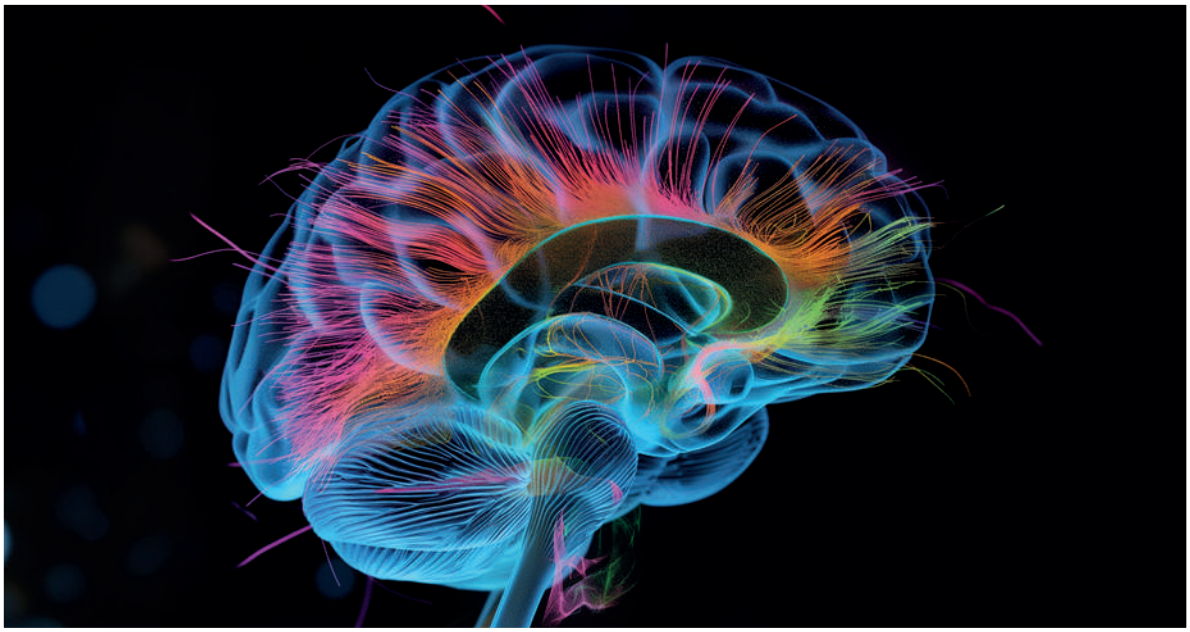
The UMBERTO Project aims to further examine the relationship between nutrition and cancer, with a particular focus on the Mediterranean diet.

Conclusion

This research provides compelling evidence for the potential of the Mediterranean diet to improve outcomes for cancer survivors. As the population of cancer survivors grows, incorporating evidence-based dietary recommendations into survivorship care plans could become an increasingly important aspect of oncology practice. MEH

Reference:

1. Bonaccio, M., et al. (2024). Mediterranean diet Is associated with lower all-cause and cardiovascular mortality among long-term cancer survivors. *JACC CardioOncology*. https://doi.org/10.1016/j.jaccao.2024.05.012



Researchers solve decades-old puzzle of lifelong memory storage

New research uncovers the crucial role of the KIBRA protein in maintaining memories for decades, offering insights into potential treatments for memory-related disorders.

A groundbreaking study published in Science Advances [1] has shed light on the molecular mechanisms underpinning long-term memory formation and retention. An international team of researchers has identified a key molecule, KIBRA (kidney and brain expressed protein), which acts as a 'glue' to solidify memory formation at the synaptic level. This discovery provides a biological explanation for how memories can persist for a lifetime, potentially paving the way for new approaches to address memory-related conditions.

The paradox of stable memories

For years, neuroscientists have grappled with a fundamental paradox: how can memories remain stable for decades when the molecular components of synapses are in constant flux? It has long been established that neurons store information as patterns of strong and weak synaptic connections, determining the function of neural networks. However, the molecules within synapses are notoriously unstable, continuously moving and being replaced within hours or days.

This study, led by researchers from New York University and SUNY Downstate Health Sciences University, provides a compelling answer to this conundrum. Professor André Fenton of New York University, one of the study's principal investigators, explains: "Previous efforts to understand how molecules store long-term memory focused on the individual actions of single molecules. Our study shows how they work together to ensure perpetual memory storage."

The role of KIBRA

Using laboratory mice, the researchers focused on KIBRA, a protein whose human genetic variants have been associated with both enhanced and impaired memory function. They investigated KIBRA's interactions with another crucial molecule in memory formation, protein kinase Mzeta (PKMzeta), an enzyme known to strengthen mammalian synapses, but which degrades after a few days.

The experiments revealed that KIBRA serves as a 'persistent synaptic tag', selectively positioning itself in activated synapses during memory formation. This molecular tag then attracts and binds to PKMzeta, maintaining the strength of these specific synapses over time.

Professor Todd Sacktor of SUNY Downstate Health Sciences University, another principal investigator, elaborates: "PKMzeta then attaches to the KIBRA-synaptic-tag and keeps those synapses strong. This allows the synapses to stick to newly made KIBRA, attracting more newly made PKMzeta."

Implications for memory disorders

This newly discovered mechanism has significant implications for understanding and potentially treating memory-related disorders. The researchers demonstrated that disrupting the KIBRA-PKMzeta bond can erase old memories, while increasing PKMzeta in the brain can enhance weak or faded memories by acting at KIBRA-tagged sites.

"The persistent synaptic tagging mechanism for the first time explains these results that are clinically relevant to neurological and psychiatric disorders of memory," notes Prof. Fenton.

A modern realisation of an ancient concept

Intriguingly, this research affirms a concept introduced in 1984 by Francis Crick, drawing parallels with the philosophical para-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Delaying diabetes onset by four years significantly reduces mortality and complications

New research demonstrates that individuals with prediabetes who can postpone the onset of type 2 diabetes by just four years through lifestyle interventions experience substantial long-term health benefits, including reduced mortality and fewer diabetes-related complications.

A recent study published in PLOS Medicine [1] has revealed that individuals diagnosed with prediabetes can significantly reduce their long-term risk of death and diabetes-related health complications by delaying the onset of diabetes for as little as four years through diet and exercise interventions. The research, led by Guangwei Li of the China-Japan Friendship Hospital, provides compelling evidence for the importance of early lifestyle interventions in prediabetic individuals.

Study design and methodology

The researchers analysed health outcomes from 540 prediabetic individuals who participated in the original Da Qing Diabetes Prevention Study, a six-year trial conducted in Da Qing City, China, beginning in 1986. Participants were allocated to either a control group or one of three lifestyle intervention groups, which involved following a healthy diet, increasing physical activity, or a combination of both. The trial included a remarkable follow-up period of over 30 years.

Key findings

Li's team assessed the long-term risk of mortality, cardiovascular events (including myocardial infarction, stroke, and heart failure), and other diabetes-related complications among the trial participants. The results showed that individuals who remained non-diabetic for at least four years after their initial diagnosis had a significantly lower risk of mortality and cardiovascular events compared to those who developed diabetes sooner.

Four-year threshold identified

Importantly, the study identified a crucial "four-year threshold" for maintaining prediabetic status. The protective effect was not observed in individuals who remained non-diabetic for less than four years, suggesting that this duration may be a critical target for intervention strategies.

Implications for clinical practice

The findings underscore the importance of implementing effective interventions targeting individuals with impaired glucose tolerance (IGT) as part of preventative management for diabetes and its associated vascular complications. Healthcare providers should emphasise the potential long-term benefits of maintaining non-diabetic status for as long as possible in prediabetic patients.

Limitations and future research

Whilst the study provides valuable insights, further research is needed to determine if the four-year threshold is universally applicable across different populations and to explore the specific mechanisms underlying the observed long-term benefits. Additionally, studies investigating the most effective intervention strategies for achieving and maintaining non-diabetic status in prediabetic individuals would be beneficial.

Conclusion

This landmark study highlights the significant impact that even a relatively short delay in diabetes onset can have on long-term health outcomes. As the global prevalence of prediabetes continues to rise, these findings emphasise the critical importance of early intervention and lifestyle modification in preventing or delaying the progression to type 2 diabetes. MEH

Reference:

1. Qian, X., Wang, J., Gong, Q., et. al. (2024). Non-diabetes status after diagnosis of impaired glucose tolerance and risk of long-term death and vascular complications: A post hoc analysis of the Da Qing Diabetes Prevention Outcome Study. *PLOS Medicine*, 21(7), e1004419. https://doi.org/10.1371/journal.pmed.1004419

dox of Theseus's Ship. This ancient Greek thought experiment questions whether an object that has had all its parts replaced remains the same object.

Prof. Sacktor explains: "The persistent synaptic tagging mechanism we found is analogous to how new planks replace old planks to maintain Theseus's Ship for generations and allows memories to last for years even as the proteins maintaining the memory are replaced."

This study marks a significant advance in our understanding of the molecular basis of long-term memory. As Prof. Fenton notes: "A firmer understanding of how we keep our memories will help guide efforts to illuminate and address memory-related afflictions in the future." MEH

Reference:

1. Fenton, A. A., Sacktor, T. C., et al. (2024). KIBRA anchoring the action of PKM maintains the persistence of memory. *Science Advances*. 26 June 2024. https://doi.org/10.1126/sciadv.adl0030

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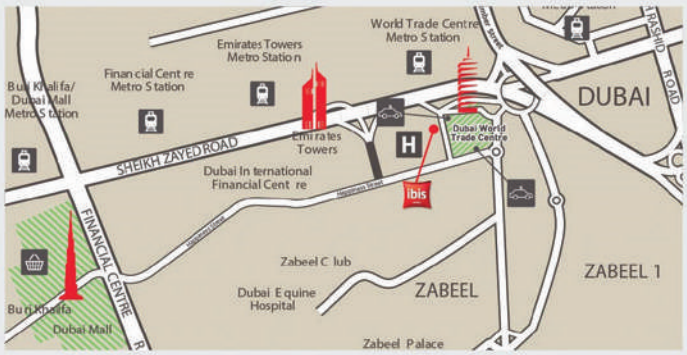

World Health Assembly agrees to pivotal IHR amendments and expedites pandemic agreement negotiations

In a landmark decision, the World Health Assembly has approved crucial amendments to the International Health Regulations (2005) and committed to finalising a global pandemic agreement within a year. These measures aim to bolster global preparedness for future health emergencies.

Historic amendments to the IHR

The 77th World Health Assembly, held in Geneva, Switzerland, from 27 May to 1 June, has ratified a package of amendments to the International Health Regulations (2005), marking a significant step towards enhancing global health security. These modifications, designed to strengthen preparedness, surveillance, and response capabilities, reflect lessons learnt from recent health emergencies, including the COVID-19 pandemic.

Key among the amendments is the introduction of a 'pandemic emergency' definition. This new classification is intended to trigger more effective international collaboration in response to events that pose a pandemic risk. The definition encompasses communicable diseases with wide geographical spread, the potential to overwhelm health systems, and the capacity to cause substantial social and economic disruption.

Dr Tedros Adhanom Ghebreyesus, WHO Director-General, emphasised the importance of these amendments, saying: "The amendments to the International Health Regulations will bolster countries' ability to detect and respond to future outbreaks and pandemics by strengthening their own national capacities, and coordination between fellow States, on disease surveillance, information sharing and response."

Solidarity and equity in focus

A notable addition to the IHR is the commitment to solidarity and equity in strengthening access to medical products and financing. This includes the establishment of a Coordinating Financial Mechanism to support the identification of and access to financing for developing countries. The mechanism aims to address core capacities and other pandemic emergency prevention, preparedness, and response-related needs.

Improved coordination and implementation

The amendments also provide for the creation of a States Parties Committee to facilitate effective implementation of the revised Regulations. This committee will promote and support cooperation among States Parties for the effective implementation of the IHR.

Additionally, the establishment of National IHR Authorities aims to improve coordination of implementation within and among countries, potentially streamlining response efforts in future health emergencies.

Expedited timeline for pandemic agreement

Concurrent with the IHR amendments, WHO Member States have agreed to accelerate negotiations on a proposed Pandemic Agreement. The Intergovernmental Negotiating Body's mandate has been extended, with the goal of finalising the agreement within a year, potentially at a special session of the World Health Assembly in 2024.

Precious Matsoso, Co-Chair of the Pandemic Accord Intergovernmental Negotiating Body, noted: "There was a clear consensus amongst all Member States on the need for a further instrument to help the world better fight a full-blown pandemic."

Dr Tedros Adhanom Ghebreyesus, WHO Director-General, speaks at the 77th World Health Assembly.

Looking ahead

The amendments to the IHR and the expedited timeline for the Pandemic Agreement represent significant progress in global health governance. These developments reflect a growing recognition of the interconnected nature of global health and the need for coordinated, equitable responses to health emergencies.

As the global health community works to implement these changes, the coming year will be crucial in shaping the future of pandemic preparedness and response. The success of these initiatives will depend on continued collaboration and commitment from WHO Member States and the broader international community. MEH

WHO issues urgent call for climate action to protect global health

The World Health Assembly has adopted a landmark resolution on climate change and health, calling for urgent action to build climate-resilient and sustainable health systems worldwide. The resolution highlights the critical link between climate change and public health, emphasising the need for rapid adaptation and mitigation efforts.

Climate change declared a major threat to global health

The 77th World Health Assembly, has recognised climate change as one of the major threats to global public health. The resolution, proposed by a coalition of 16 countries, including the UK, Brazil, and the United Arab Emirates, calls for immediate action to address the health impacts of climate change.

The assembly acknowledged that increasingly frequent extreme weather events are taking a rising toll on people's physical and mental health, as well as threatening health systems and facilities. Changes in weather and climate are also impacting biodiversity, food security, air quality, and access to safe water, leading to an increase in food-, water-, and vector-borne diseases.

Health systems urged to reduce carbon footprint

In a notable development, the resolution highlights that modern health systems contribute to approximately 5% of global carbon emissions. This includes emissions from the entire supply chain, from product manufacturing to waste disposal. The WHO is now calling for mitigation and adaptation actions, as well as the use of new technologies, to make health systems more environmentally sustainable.

Dr Tedros Adhanom Ghebreyesus, WHO Director-General, issued an urgent call for global climate action to promote health and build climate-resilient and sustainable health systems. The resolution emphasises that the pace and scope of current mitigation and adaptation efforts are being surpassed by climate change threats, resulting in both sudden and long-term impacts on health and well-being.

Funding and research priorities

The assembly recognised that limited access to finance is one of the major obstacles to developing climate-resilient and sustainable health systems. The resolution calls for efforts to mobilise resources from all sources for integrated action on climate and health, with a focus on developing countries that are particularly vulnerable to the adverse effects of climate change.

The WHO has been tasked with developing a results-based, needs-oriented, and capabilities-driven global plan of action on climate change and health by the 78th World Health Assembly in 2025. This plan will integrate climate considerations across all levels of the WHO's technical work and emphasise the need for cross-sectoral cooperation.

One Health approach and gender equality

The resolution underscores the importance of adopting a One Health approach to address the complex, multidimensional challenges posed by climate change, pollution, and biodiversity loss. It also emphasises the need to pay particular attention to those disproportionately impacted by climate change, especially women and girls, when shaping inclusive and equitable climate action and health systems.

Member states urged to take action

The resolution calls upon WHO member states to commit to several key actions, including:

1. Strengthening the implementation of WHO's global strategy on health, environment, and climate change
2. Conducting periodic climate change and health vulnerability and adaptation assessments
3. Developing national action plans for decarbonisation and ensuring environmentally sustainable health systems
4. Integrating climate data into existing health monitoring and surveillance systems
5. Collaborating with the Alliance for Transformative Action on Climate and Health (ATACH)
6. Promoting inter and multisectoral cooperation between national health ministries and relevant climate change authorities

Looking ahead

The WHO has been requested to report on progress in implementing this resolution to the World Health Assembly in 2025, 2027, and 2029. This includes updates on the development and implementation of the global plan of action on climate change and health.

As climate change continues to pose significant threats to global health, this resolution marks a crucial step towards integrating health considerations into climate policy processes and climate considerations across health policy agendas. The medical community will play a vital role in driving these changes and ensuring that health remains at the forefront of climate action. MEH

WHO calls for 'economics of health for all' approach to tackle global health challenges

The World Health Assembly has adopted a resolution urging member states to consider the interlinkage between health and the economy, placing people's wellbeing at the centre of policy-making.

In a landmark resolution adopted at the 77th World Health Assembly, the World Health Organization (WHO) has called on member states to implement an 'economics of health for all' approach in their national policies. The resolution, proposed by a coalition of 17 countries including Austria, Brazil, China, and the United Kingdom, emphasises the need for a paradigm shift in how governments view health expenditure – not as a cost, but as an investment in future generations.

Recognising the interconnectedness of health and economy

The resolution acknowledges the mutually reinforcing nature of health, wellbeing, and the economy. It urges member states to consider an 'economy of wellbeing' perspective, which puts people and their health at the centre of decision-making. This approach recognises that economic policies need to be fiscally sustainable, socially responsible, and inclusive, while also considering environmental health in economic policy-making.

Dr Tedros Adhanom Ghebreyesus, WHO Director-General, is expected to develop a strategy on implementing this approach, to be considered at the 79th World Health Assembly in 2026.

Investing in health systems and addressing determinants of health

The resolution emphasises the critical importance of investing in health systems, including the health workforce, and addressing broader determinants of health. It notes that these investments are crucial for pandemic prevention, preparedness, and response, as well as for building resilient societies, communities, and economies.

Member states are urged to invest in health system infrastructure, including capacitating and retaining human resources for health. The resolution also calls for addressing social and economic determinants that result in health inequities, including gender inequalities and differences in the level of development.

Shifting towards sustainable and equitable investments

A key aspect of the resolution is the call for shifting public and private investments from activities harmful to people's health and wellbeing towards those that improve them. This includes enhancing corporate social responsibility and considering the mutually reinforcing linkages between the economy and the health of humans, animals, plants, and the environment.

The resolution encourages member states and international partners to support knowledge and information exchange on fiscal policies that promote investment in common goods for health, while ensuring efficiency and fiscal sustainability.

Building capacity for multisectoral engagement

Recognising the need for a whole-of-government and whole-of-society approach, the resolution calls for increased engagement between the health sector and other sectors, including finance. It requests the WHO Director-General to support strengthening the capacity of national health authorities to better engage and negotiate with finance and other sectors towards an economics of health for all approach in national policies.

The WHO is also tasked with providing technical support to countries on domestic resource mobilisation and other fiscally sustainable ways to finance the progressive realisation of the right to health, including financing universal health coverage and primary healthcare.

Global coordination and reporting

The resolution requests the WHO to work with member states and other UN agencies to define key messages on the economics of health for all and incorporate them into future UN conferences. It also calls for strengthening WHO country offices' access to expertise to provide technical support to member states.

The WHO Director-General is required to report on the implementation of this resolution at the 79th World Health Assembly in 2026, with progress reports to be submitted in 2028 and 2030.

Conclusion

This resolution marks a significant step towards recognising health as a cornerstone of sustainable economic development. By urging member states to adopt an 'economics of health for all' approach, the WHO aims to foster more resilient, equitable, and sustainable health systems worldwide. MEH

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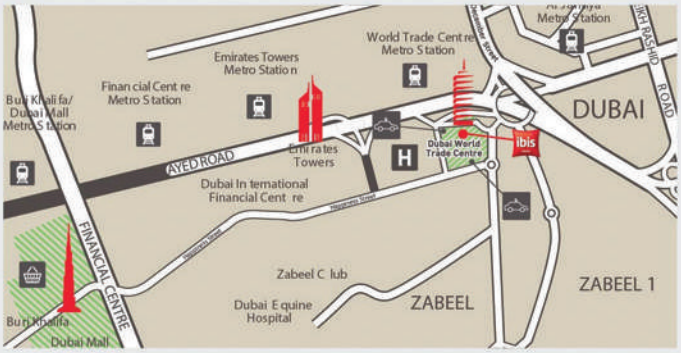

New paediatric pain management manual to aid clinicians in conflict zones

The World Innovation Summit for Health (WISH), a global health initiative of Qatar Foundation, has announced the development of a groundbreaking Paediatric Trauma Pain Management Manual. This resource, available in both Arabic and English, aims to support clinicians treating children with life-altering injuries in conflict-affected areas.

Addressing a critical gap in paediatric care

Despite the alarming statistic that one in six children reside in conflict zones [1], there has been a notable absence of comprehensive guidance for clinicians treating paediatric blast injuries. Children exposed to blast events often sustain more severe injuries than adults and face higher mortality rates. The underestimation and undertreatment of pain in these young patients can lead to poor outcomes and lifelong physical, psychological, and social consequences.

Dr Paul Reavley, Paediatric Emergency Medicine Consultant at Bristol Royal Hospital for Children and project lead, emphasised the importance of the manual: "Paediatric care in conflict zones is often delivered by clinicians who have little experience in treating children. We are looking to give doctors working on the ground in conflict zones both the tools and the confidence to treat children experiencing the horrific and painful consequences of blast injuries, which in turn will allow for better assessment, treatment, and communication with children, from injury to rehabilitation and beyond."

Collaborative development and expertise

The manual is being developed in collaboration with the UK-based Paediatric Blast Injury Partnership, building upon their 2019 Paediatric Blast Injury Field Manual[2]. WISH facilitated the Arabic translation of the original manual with support from the Translation and Interpreting Institute of Qatar Foundation's Hamad Bin Khalifa University.

The new resource will encompass pain management strategies across the entire care continuum, from the initial point of blast injury through acute care and long-term follow-up. A diverse team of experts is contributing to its development, including:

- Doctors undergoing training at Hamad Medical Corporation (HMC) from Gaza
- Pain specialists from Qatar
- Clinicians and academics in paediatrics and pain management from Bristol Royal Hospital for Children, the University of Bath, and Kidconfident.org

Addressing immediate needs in conflict zones

The manual's development has been accelerated in response to the urgent situation in Gaza. Since November 2023, over 1,000 copies of the Arabic version of the Paediatric Blast Injury Field Manual have been distributed to medics in the region. Additionally, WISH has facilitated Ukrainian and Russian translations of the blast injury manuals, which have been disseminated across Ukraine by Save the Children.

Clinical focus group refines content

To ensure the manual's relevance and efficacy, WISH convened a Pain Management Clinical Focus Group in Doha on 27 April. This meeting brought together 30-40 Qatar-based clinicians with first-hand experience in Palestine and other conflict settings. Participants included pain experts from Sidra Medicine and HMC, as well as doctors from Gaza and the West Bank currently enrolled in fellowship training at HMC as part of a programme organised by Qatar's Ministry of Public Health.

Dr Abdullatif AlKhal, Deputy Chief Medical Officer and Director of the Department of Medical Education at HMC, highlighted the value of this collaborative approach: "Their first-hand knowledge of working on the ground in extremely challenging conditions gives them a valuable perspective on delivering care. Working together with the Paediatric Blast Injury Partnership and WISH, we have the best chance of developing a Paediatric Pain

Gigi Ibrahim/Flickr

Management Manual that will provide vital support to healthcare professionals working on the ground in conflict zones in Gaza and elsewhere."

Launch and future impact

The Paediatric Trauma Pain Management Manual is scheduled for official launch at the WISH 2024 international healthcare summit on 13-14 November this year at the Qatar National Convention Centre in Doha. This resource is poised to make a significant impact on paediatric care in conflict zones globally.

Sultana Afdhal, Chief Executive Officer of WISH, underscored the urgency of this initiative: "Given the suffering of the growing number of severely injured children in Gaza, we knew that there was a chronic need for a focus on pain relief. Speaking with Paul Reavley made it clear that developing a follow-on manual to the Paediatric Blast Injury Field Manual would be an effective way to provide help."

The development of this manual represents a important step forward in addressing the complex medical needs of children affected by conflict. By providing clinicians with specialised guidance on pain management, it has the potential to improve outcomes and quality of life for countless young patients in some of the world's most challenging healthcare environments. MEH

About the Paediatric Trauma Pain Management Manual

The comprehensive end-to-end pain management manual will guide the clinician at each point of the child's care pathway, from point of injury to discharge from care. The manual will address acute and chronic pain management and will use pharmacological and non-pharmacological techniques as well as addressing psychosocial aspects of pain management. The manual will complement the Paediatric Blast Injury Field Manual but it will also be a standalone resource. The manual will be relevant in multiple contexts but will be targeted for clinicians dealing with conflict trauma in children.

The manual will be divided into sections relevant to the stage of the child's care pathway:

- Prehospital
- Resuscitation
- Perioperative
- Intensive care
- Ward and rehab
- Chronic pain

It will include pharmacological and non-pharmacological management of pain, regional anaesthesia techniques, procedural pain management (and sedation) and play/distraction techniques. There will be a strong theme of psychosocial care throughout the manual. It will also include pain and distress management in the dying child.

It will be made freely available and be translated into a number of different languages.

References:

1. Østby, G., Rustad, S. A., Tollefsen, A. F. (2020). Children affected by armed conflict, 1990–2018. Conflict trends, 1.
2. *https://www.imperial.ac.uk/media/imperial-college/research-centres-and-groups/centre-for-blast-injury-studies/PBIP-BlastInjuryManual2019_1_web.pdf*

Heidelberg University Hospital – Children Hospital

Congenital Heart Disease
– specialized care makes the difference

Overview

Heidelberg University Medical Center, ranked 15th among the world's best hospitals and 2nd among the best German hospitals in the Newsweek 2024 ranking, is renowned for its specialized clinical care across all fields of medicine. Its world-class research and teaching activities ensure continuous progress and the most up-to-date patient care.

Congenital Heart Disease

One in every 100 children is born with congenital heart disease (CHD), affecting approximately 1.4 million children globally each year. CHD encompasses a wide range of heart and blood vessel malformations, requiring comprehensive care in highly specialized medical centres that offer both surgical and interventional treatments.

One such centre is the Heidelberg University Congenital Heart Centre.

Under the leadership of Prof. Tsvetomir Loukanov, the congenital cardiac surgery team at Heidelberg performs the full spectrum of congenital cardiac surgeries for patients of all ages, from neonates to adults with CHD. The congenital cardiology team, led by Prof. Matthias Gorenflo, provides perioperative care, diagnostics, and interventional treatments.

Excellent care

To ensure excellent care for each patient, interdisciplinary approaches are employed whenever necessary. The comprehensive nature of Heidelberg University Medical Center allows specialists from various medical fields to be available at the patient's bedside instantly. Excellent cooperation with the neighbouring cardiovascular departments (Cardiology: Prof. Norbert Frey; Cardiac Surgery: Prof. Matthias Karck) and other paediatric care departments creates a robust safety net for patients of all ages.

Within this highly patient-oriented structure, Prof. Loukanov and his team provide surgery for CHD. The group of six cardiac surgeons is dedicated to treating patients with the whole spectrum of complex congenital heart disease and other rare heart conditions. Each year, the surgeons perform more than 400 surgeries. A main focus of this department is treating children with vascular anomalies, which can cause compression of the airways and oesophagus, leading to breathing and swallowing difficulties. Correction of these malformations often involves rerouting the vasculature to relieve compression and sometimes performing corrective surgery on the trachea.

Treatment of neonates with critical CHD

Another key focus is the treatment of neonates with critical CHD. Complex procedures, such as the arterial switch operation, aortic arch repairs, and correction of pulmonary venous and coronary artery anomalies, are performed within the first days of life. Treating these vulnerable patients requires the profound expertise of the entire interdisciplinary team. Thanks to significant advancements in CHD surgery over recent decades, more than 95% of children with

Heidelberg University Hospital – Centre for Pediatric and Adolescent Medicine

CHD now survive into adulthood, leading to a growing population of adults with congenital heart disease (GUCH). These patients often require repeated surgical or interventional treatments, best provided by an interdisciplinary team combining paediatric and adult cardiac and extracardiac care. At Heidelberg University Medical Center, GUCH patients receive the full spectrum of care.

Services for international patients

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UK HD

New screening tool for paediatric sleep disorders developed

Researchers from the University of Oklahoma and The University of Tulsa have created a novel structured clinical interview to assess multiple sleep disorders in children simultaneously, potentially streamlining diagnosis and treatment.

A groundbreaking screening tool for paediatric sleep disorders has been developed by researchers at the University of Oklahoma in collaboration with The University of Tulsa. This innovative structured clinical interview, the first of its kind, enables healthcare professionals to evaluate children for multiple sleep issues concurrently, facilitating more rapid assessment and targeted treatment recommendations.

Comprehensive assessment

The research underpinning this new tool was recently published in the journal *Behavioral Sleep Medicine* [1]. The study details the efficacy of the interview questions across various sleep disorders, which often present with overlapping symptoms but may require distinct therapeutic approaches.

Dr Tara Buck, an associate professor in the OU School of Community Medicine in Tulsa and child and adolescent psychiatrist, explained the significance of the tool: "Sleep problems can be common in kids, but we have not had a means of getting a comprehensive view of what is going on with their sleep. It takes time to go through all the individual disorders to narrow down what's going on. This structured clinical interview allows us to screen for the most common sleep problems at once and gain a better idea of how to treat them."

Development process

The structured clinical interview was developed under the leadership of Dr Mollie Rischard, a post-doctoral fellow in the Department of Psychiatry at the OU School of Community Medicine. The project, which served as her doctoral dissertation at The University of Tulsa, involved adapting the existing adult comprehensive assessment for sleep disorders to suit paediatric populations.

The development process was rigorous, involving multiple iterations, input from clinical experts, and alignment with criteria in the Diagnostic and Statistical Manual. The tool's effectiveness was subsequently validated through clinical trials.

Addressing diagnostic challenges

While polysomnography remains the gold standard for diagnosing sleep disorders, it is a costly and potentially unnecessary procedure in some cases. Dr Rischard highlighted the importance of preliminary screening: "Sleep apnoea, for example, is a medical problem that must be diagnosed through a sleep study, but before we make costly referrals and ask families to undergo a sleep study, we want to be as sure as we can that it's necessary. There are a lot of overlapping symptoms among sleep disorders, where a child has difficulty falling asleep and staying asleep, so it's important to determine what is driving the problems."

The structured clinical interview aims to provide a more nuanced understanding of a child's sleep issues, potentially guiding treatment decisions more effectively. Dr Rischard noted that cognitive behavioural therapy can be efficacious for several sleep disorders.

Importance of addressing sleep problems

The researchers emphasised the critical nature of targeting sleep problems in children due to their significant impact on daytime functioning. Dr Rischard explained: "It's not just excessive daytime sleepiness, but we often see a paradox where kids can appear hyperactive and may be misdiagnosed with

something like ADHD. Many sleep disorders are very treatable because we make behavioural changes that can produce quick improvements. And if you start sleeping better, you genuinely feel better."

Nightmares and mental health

The development of this comprehensive screening tool was partly motivated by a related research collaboration between the University of Oklahoma and The University of Tulsa, focusing on a new cognitive behavioural treatment for youth with nightmares.

Dr Lisa Cromer, a professor of psychology at TU and volunteer child psychiatry faculty member at OU-Tulsa, led the development of this treatment. She highlighted the growing recognition that nightmares should be addressed as a distinct issue rather than merely a symptom of another problem.

"There is growing evidence that nightmares are a signal for very serious mental health problems, in particular suicidal ideation and behaviour," Dr Cromer said. "Another big risk factor for suicidality is impulsivity, and we know that people are better able to control impulses when they've been sleeping well."

Paradigm shift in nightmare treatment

The cognitive behavioural treatment developed by Dr Cromer incorporates relaxation strategies, stress management, sleep behaviours, and visualisation techniques to alter dream structures. Preliminary data from the ongoing trial indicate a promising reduction in suicidal ideation among children with nightmares following treatment.

Dr Buck commented on the significance of this approach: "In the past, we've seen nightmares as a symptom of other conditions, and we thought there wasn't much we could do. We might try to treat their PTSD or anxiety and hope that the nightmares got better. But now there are treatments to empower kids to reduce or eliminate their nightmares. It's a paradigm shift for both families and health professionals."

This new structured clinical interview for paediatric sleep disorders represents a significant advancement in the field of sleep medicine, potentially improving diagnostic accuracy and treatment outcomes for children experiencing sleep-related issues. MEH

Reference:
Rischard, M., Buck, T., et al. (2024). Construction and Initial Examination of Inter-Rater Reliability of a Structured Clinical Interview for DSM-5-TR Sleep Disorders (SCISD) – Kid. *Behavioral Sleep Medicine*. https://doi.org/10.1080/15402002.2024.2324035

Childhood sleep disorders linked to ADHD symptoms in preadolescence

New research from the Spanish CIBER consortium reveals a strong association between sleep disorders in children aged 8-9 and the development of attention-deficit/hyperactivity disorder (ADHD) symptoms two years later. This study offers valuable insights into the potential early indicators of ADHD, which affects approximately 7.5% of children.

Methodology

The investigation, led by Dr Llúcia González-Safont from the University of Valencia, analysed data from 1,244 children across three Spanish regions. Researchers utilised the following assessment tools:

Child Behavior Checklist (CBCL) for ages 6-18: To evaluate sleep disorders at ages 8-9

Conners Parent Rating Scale (CPRS-R:S): To assess ADHD manifestations at ages 10-11

Key Findings

Robust association

The study demonstrated a significant correlation between childhood sleep disorders and subsequent ADHD symptoms, even after controlling for various confounding factors.

Dr González-Safont commented, "Although not all children with sleep disorders will develop symptoms of ADHD, detecting them at an early stage, with questionnaires that are easy to apply in paediatric consultations, could contribute to preventing or mitigating future symptoms of behavioural problems like ADHD."

Prevalence rates

Previous research has shown:

- Sleep disorders affect approximately 20% of children
- ADHD prevalence ranges from 3% to 7.5% in children
- Among children with ADHD, sleep disorders are present in 25% to 73.3% of cases

Implications for clinical practice

The findings suggest potential benefits in incorporating sleep disorder screening tools into primary care programmes. Dr González-Safont advocated for their inclusion in initiatives such as the Children's Health Programme.

Conclusion

While the results are promising, the researchers emphasise the need for cautious interpretation. The study, published in the *European Journal of Pediatrics* [1], underscores the importance of healthy sleep habits in childhood and their potential impact on neurodevelopmental outcomes. MEH

Reference:
González-Safont, L., Rebagliato, M., Arregi, A. *et al.* Sleep problems at ages 8–9 and ADHD symptoms at ages 10–11: evidence in three cohorts from INMA study. *European Journal of Pediatrics* (2023). https://doi.org/10.1007/s00431-023-05145-3

Extending CPAP treatment in preterm infants improves lung function, study finds

A new study has revealed that prolonging the use of continuous positive airway pressure (CPAP) treatment in premature infants by two weeks significantly enhances lung volume and diffusion capacity. The research, presented at the Pediatric Academic Societies (PAS) 2024 Meeting in Toronto in May, offers promising insights into improving respiratory outcomes for preterm infants.

Preterm birth remains the leading cause of altered lung development and respiratory complications that can persist into adulthood. While CPAP treatment is widely used to support breathing in preterm infants, there has been a lack of consensus regarding the optimal duration of treatment, particularly for infants who appear to be clinically stable.

Study design and methodology

The randomised controlled trial, led by researchers from Oregon Health & Science University, aimed to investigate the effects of extending CPAP treatment beyond the point at which infants met stability criteria for discontinuation.

Cindy T. McEvoy, MD, MCR, professor of paediatrics at Oregon Health & Science University and the study's presenting author, explained the rationale behind the research: "Extending CPAP treatment may be a simple and safe approach to improving preterm infant lung function and breathing in the absence of a lung growth therapy."

The study enrolled 100 infants born at or before 32 weeks' gestation who had required at least 24 hours of CPAP for clinical care. Upon meeting predetermined stability criteria, infants were randomised to either receive an additional two weeks of CPAP (extended CPAP group) or be transitioned to room air (discontinued CPAP group), which represented usual care at the researchers' neonatal intensive care unit (NICU).

Key findings

Immediate effects in the NICU

The extended CPAP group demonstrated a significantly increased functional residual capacity (FRC) compared to the discontinued CPAP group at the end of the two-week treatment period in the NICU. This finding builds upon previous research by the same team, which had shown similar improvements in FRC with extended CPAP use.

Long-term outcomes

At six months of corrected age, 93 of the 99 infants who completed the study underwent lung function testing. The results were striking:

1. Alveolar volume (VA): Infants in the extended CPAP group exhibited significantly larger alveolar volumes compared to those in the discontinued CPAP group.
2. Lung diffusion capacity (DLCO): The extended CPAP group also demonstrated superior lung diffusion capacity, indicating improved gas exchange efficiency.

These findings suggest that the benefits of extended CPAP treatment persist well beyond the neonatal period, potentially influencing long-term respiratory health.

Implications for clinical practice

The study's results provide valuable evidence to support the extension of CPAP treatment in stable preterm infants. Dr McEvoy highlighted the significance of these findings, saying: "The study's findings solidify CPAP treatment as beneficial for preterm infants without requiring pharmaceuticals."

This non-pharmacological approach to improving lung function in preterm infants is particularly appealing, as it leverages an existing treatment modality without introducing additional risks associated with medication use in this vulnerable population.

Future directions

While the study demonstrates clear benefits of extended CPAP use, several questions remain for future research:

1. Optimal duration: Further studies may be needed to determine if additional extensions of CPAP treatment could yield even greater benefits.
2. Long-term follow-up: Investigating whether the observed improvements in lung function at six months translate to better respiratory outcomes in childhood and beyond will be crucial.
3. Individualised approaches: Identifying factors that may predict which infants are most likely to benefit from extended CPAP treatment could help in tailoring care protocols.

Conclusion

This research provides compelling evidence for the benefits of extending CPAP treatment in stable preterm infants. By demonstrating improvements in both alveolar volume and lung diffusion capacity at six months of age, the study offers a promising strategy for potentially mitigating the long-term respiratory consequences of preterm birth.

As Dr McEvoy and her colleagues conclude: "Since premature infants have impaired alveolarisation and vascularisation, an increased VA and DLCO may lead to improved infant respiratory health/improved lung function trajectory."

The findings from this study are likely to inform future clinical guidelines and may lead to a paradigm shift in the management of respiratory support for preterm infants in NICUs worldwide. As further research builds upon these results, clinicians and families alike can look forward to improved outcomes for this vulnerable patient population. MEH

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Our International and Private Care Service supports over 5,000 children from 90 countries each year. The service is tailored to the referral and treatment of international patients and our dedicated international team ensure a nurturing and family-centred patient experience.

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Salem with Mr Stefano Giuliani, Dr Martin Samuels and Dr Paul Aurora

Transforming paediatric respiratory care: Great Ormond Street Hospital's Phrenic Nerve Pacing services

Great Ormond Street Hospital (GOSH) is at the forefront of paediatric healthcare, offering innovative solutions to complex medical challenges. Among its pioneering services is Phrenic Nerve Pacing (PNP), a medical procedure where a breathing pacemaker is surgically implanted onto the phrenic nerves to help manage respiratory conditions in children. Salem's journey with ROHHAD syndrome exemplifies the impact of PNP and highlights the comprehensive care and expertise available at GOSH.

Salem, a young boy from Qatar, was diagnosed with ROHHAD (rapid-onset obesity with hypothalamic dysfunction, hypoventilation, and autonomic dysregulation) syndrome at the age of four. His condition is characterised by rapid weight gain and hypoventilation or under-breathing, and he needed treatment with a mechanical ventilator helping him to breathe deeply enough, especially during sleep. This posed significant challenges to his health and well-being. Concerned about the long-term implications of continuous mechanical ventilation, Salem's family sought alternative treatment options abroad.

After extensive research and consultation, Salem's family turned to Great Ormond Street Hospital for a second opinion. Led by Dr Paul Aurora and a multidisciplinary team of specialists, including Dr Martin Samuels and Dr Elaine Chan, Salem underwent a comprehensive evaluation. Recognising the potential of PNP to improve Salem's quality of life, the medical team proposed this innovative approach as an alternative to tracheostomy.

PNP provided with keyhole surgery

PNP involves implanting a breathing pacemaker on the phrenic nerves, which control the diaphragm's movement. Un-

like traditional interventions, such as tracheostomy, PNP can be provided with keyhole surgery, leading to fewer post-operative complications. Dr Martin Samuels highlighted the broader implications of PNP: "Conventional mechanical ventilation typically involves surgery to place a tracheostomy tube in the front of the neck or wearing a face mask and connection of the tube or mask to tubing to bulky equipment which limits daytime mobility. Phrenic Nerve Pacing presents a discreet alternative by stimulating the diaphragm, enabling natural breathing without the requirement for cumbersome apparatus. Utilising a compact and lightweight external pacing box allows Salem to significantly enhance his mobility during the day, providing a more comfortable and inconspicuous solution for his respiratory challenges."

Salem's surgery, performed by Mr Stefano Giuliani using an innovative minimally invasive technique (thoracoscopy), marked a significant milestone in his treatment journey. The procedure favours a quick recovery with less post-operative pain compared to traditional open surgery. Following surgery, Salem remained under close monitoring at GOSH, where the PNP system was gradually introduced and optimised to meet his specific needs. The GOSH team included experts in sleep medicine, long-term ventilation, cardiology, endocrinology, gastroenterology, and oncology. Each specialist brought a wealth of experience to Salem's care, ensuring all aspects of his complex condition were managed effectively.

The power of multi-specialist collaboration

Dr Paul Aurora remarked: "ROHHAD is a very unusual condition, and it is essential that children with this diagnosis are reviewed by multiple specialists who have experience in dealing with it. We are extremely fortunate at GOSH to have all the expertise on one site. In addition, we were able to reassure our colleagues in Qatar that we would provide long-term support, not just for the PNP system but also for any other medical complications that Salem could develop in the future."

This multidisciplinary approach not only addressed Salem's immediate respiratory needs but also provided holistic care that considered his overall health and development.

The success of Salem's treatment transformed his life, allowing him to breathe independently during the day and engage in everyday activities with greater ease and comfort. Beyond Salem's individual journey, his case highlights the broader significance of PNP as an innovative and effective treatment option for children facing similar challenges. At Great Ormond Street Hospital, our Phrenic Nerve Pacing services represent a pioneering approach to paediatric respiratory care, offering tailored solutions and comprehensive support to children and their families.

Key advantages of PNP include its minimally invasive nature, enhanced mobility, improved quality of life, and ongoing support from our multidisciplinary team of specialists.

Through continued research, collaboration, and compassionate care, GOSH remains committed to advancing paediatric respiratory medicine and delivering life-changing solutions for children with complex conditions.

For more information about our Phrenic Nerve Pacing services and how we can support your patients, please get in touch. Together, we can make a difference in the lives of children and families facing respiratory challenges. MEH

High-speciality hospital in Barcelona treats complex paediatric diseases

SJD Barcelona Children's Hospital is a university, maternity, and paediatric hospital dedicated exclusively to caring for pregnant women, children, and teenagers under the age of 18. With an over 150-year history, we are one of Europe's busiest children hospitals.

Every year, our professionals care for 350,000 patients from around the world.

patients with complex diseases, and although we treat patients with diseases that are 17% more complex compared with Spanish institutional published standards, our mortality and readmission rates are lower. In oncology, for example:

- 90% of patients with a low-grade brain glioma and 84% of patients with a Ewing's sarcoma overcome the disease after 10 years.

Healthcare Activity	Facilities	Main Specialities
• 25,500 patients discharged	• 314 beds	• Paediatric surgery
• 250,000 outpatient's cases	• 14 high-tech theatres	• Foetal surgery
• 180,000 emergency cases	• 6 labour and birthing rooms	• Cardiology
• 15,500 surgical operations	• 10 diagnostic rooms	• Rare diseases
• 3,300 births	• 15 rehabilitation rooms	• Neurology and neurosurgery
		• Orthopaedics and traumatology
		• Oncology

Our team consists of more than 3,400 specialized paediatric professionals, trained at internationally renowned facilities around the globe. Our main specialities are **paediatric surgery, foetal surgery, cardiology, rare and complex diseases, neurology and neurosurgery, oncology and orthopaedics and traumatology.**

At the SJD Barcelona Children's Hospital we have treated **more than 28,500**

- 94% of our patients with lymphoblastic leukaemia survive after five years.
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Our specialised SJD Pediatric Cancer Centre treats over **400 children and teenagers with cancer every year**. It is a monographic paediatric cancer centre, unique in Spain, and one of the largest in Europe and worldwide.

We have a high capability to **develop advanced therapies in childhood oncology**, which are available in very few centres worldwide, as for example:

- **CART-19 immunotherapy** involves modifying the patient's own lymphocytes to destroy cancer cells
- We were the first hospital in the world (with the Memorial-Sloan Kettering Cancer Center (MSKCC) in New York) to offer **anti-G2 immunotherapy with naxitamab** to treat refractory high-risk neuroblastomas.
- Oncolytic viruses genetically modified to destroy the **eye tumour**

We are one of the leading centres in Europe for **scientific research** into paediatric diseases. We have **over 600 researchers** who work tirelessly to continue building knowledge about the diseases that impact children and pregnant women. We have the highest number of paediatric clinical trials in Spain and boast a tissue and tumour bank. We have **over 300 active clinical trials**, in over 20 different areas of therapeutic paediatrics, and almost 70% of them concern complex paediatric diseases.

A hospital centred on paediatric patients and their families

At the SJD Barcelona Children's Hospital, we work hard to reduce the impact of hospitalisation on our patients. That is why the design and comfort of our facilities is so important, as a pleasant environment can help reduce anxiety in children receiving treatment.

Our aim is no pain. We know that distraction is a very powerful tool in reducing the perception of pain during routine care. That is why we have dogs, music, art and clown performers involved in our therapies – even canine-assisted operations! MEH

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High-speciality hospital in Barcelona treating complex paediatric diseases

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Groundbreaking CAR-T cell therapy for teenage and young adult patients with blood cancer

CAR-T cell therapy has been one of the most significant advances in cancer treatment for many years, successfully treating patients with leukaemia when other treatment options have failed. University College Hospital in London is one of the few centres internationally to offer CAR-T cell therapy for teenage and young adult patients with blood cancer.

A personalized living drug targeting cancer cells

T-cells are part of our natural immune system, working in a targeted way to attack specific invaders in the human body. In CAR-T cell therapy, T-cells are harvested from a patient and sent away for genetic modification, so they recognise, seek out, and destroy their own specific cancer cells, leaving the healthy cells alone. It is like producing a personalised living drug which targets proteins on the surface of leukaemia cells.

CAR-T cell therapy is a highly effective, novel therapy for under 25s with B-acute lymphoblastic leukaemia (B-ALL). It is most frequently used in patients with relapsed disease but can be used earlier if the leukaemia is not responding to chemotherapy. It can also be used in some subtypes of aggressive lymphoma.

Highly specialized environment and expertise for optimal patient care

The treatment has several stages. The initial T-cell harvesting process takes four to six hours with few side effects. T-cells are then sent to a drug manufacturer where they are modified to accurately target the cancer cells.

During this time (three to six weeks), patients are given a gentle cycle of chemotherapy, usually as an outpatient, to keep their leukaemia controlled with as few side effects as possible. Patients are monitored to check whether it is an appropriate time to be given CAR-T therapy, and then admitted to hospital for two to four weeks where they are given a course of chemotherapy followed by an infusion of modified cells.

As patients are at an elevated risk of infection, cytokine release syndrome, or the unique neurological side effects of CAR-T, it is vital they remain in a highly specialised environment where staff are experts in both recognising these symptoms and treating similar patients. University College Hospital has a world-leading adolescent cancer centre with access to an on-site intensive care unit. It has some of the best international expertise in treating teenage and young adult cancer patients; the only dedicated London centre to do so.

Patients are monitored carefully for around three months after treatment. Tests during this time include bone marrow and blood tests to check for progress. Initially they will stay as an inpatient, but if it looks like the disease has responded to treatment they can be discharged and seen as an outpatient after 28 days. The team is experienced in managing any side effects and patients are carefully monitored after treatment in case issues arise.

Holistic approach: Addressing psychological well-being and cultural support

Patient care at University College Hospital is delivered in an age-appropriate way by expert consultants (including those on the UK CAR-T advisory panel), nurse specialists, and other allied health professionals. Patients are looked after holistically, including their psychological wellbeing, which is extremely high priority.

For Arabic patients, a team of advocates is on hand to support patients, families and healthcare professionals navigate their way through both treatment and settling into the UK. Patients are also able to enjoy day-rooms, a gym, and relaxation rooms which have been designed in collaboration with adolescent patients, helping them to feel comfortable and at home.

Follow-up care and monitoring for sustained remission

Follow-up care is usually managed via phone or video consultations from the patient's home country during month four and five, and a return visit in month six is required to check all is well. MEH

For more information:

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Expert pediatric care in a healing environment

Located on the East Coast in historical Charleston, South Carolina, U.S.A., the Medical University of South Carolina (MUSC) Shawn Jenkins Children's Hospital (SJCH) has cared for patients and their families since the early 1900's. This long history of providing expert care in over 27 specialties ensures a thoughtful approach to all complex or rare pediatric conditions and diseases.

Opened in February 2020, The MUSC Shawn Jenkins Children's Hospital (SJCH) <*http://musckids.org*> consists of over 250 beds and includes a Level 1 trauma center, the state's only pediatric burn center and solid-organ and bone marrow transplant programs, the state's largest Level 4 neonatal intensive care unit, an advanced fetal medicine center and a top-4 ranked *U.S. News & World Report* children's cardiology & cardiac surgery program for two years in a row. Designed with input from over 200 providers and families passionate about building a healing environment, this new hospital provides unmatched attention and care to the patient and family experience.

MUSC Children's Health pediatric and congenital heart center located in SJCH performed over 15 heart transplants last year and is on pace to exceed that number this year. Our surgical outcomes are among the very best in the United States and our Society of Thoracic Surgeons (STS) data consistently outperforms benchmarks. The third floor of our children's hospital houses our heart center and includes a pediatric cardiology intensive care unit.

Our team treats the full spectrum of heart disorders ranging from babies still in the womb to adults. With a team of experts, including three cardiac surgeons, seven cardiac anesthesiologists, and more than 20 cardiologists, the MUSC Children's Health Pediatric and Congenital Heart Center is among the largest pediatric heart programs in the United States. We offer numerous sub-specialty programs encompassing all types of heart disease. Our depth and experience allow us to specialize in all areas of cardiology, including cardiac catheterization [1], cardiac critical care [2], echocardiography and advanced three-dimensional imaging, heart failure, arrhythmias and electrophysiology.

MUSC Children's Health neurosurgeons routinely perform life-saving and complex procedures that influence global care. Our innovative approach to resolving undiagnosed conditions results in a highly respected program that offers safe and new techniques that families travel long distances to receive. The surgical team teaches their innovations to providers across the globe.

Our **pediatric orthopedic** team regularly cares for spina bifida, cerebral palsy, scoliosis and spinal deformity patients incorporating the latest robotic technology for enhanced surgical precision, shorter hospital stays, and fewer complications. Our three surgeons are all trained to safely perform the most complex skeletal procedures with excellent outcomes.

Housed within the SJCH, the Pearl Tourville Women's Pavilion (PTWP) [3] seamlessly integrates children's care and obstetrical services, thereby enhancing safety and improving outcomes in high-risk pregnancies. Working collaboratively with the advanced fetal care center for families expecting babies with complex congenital birth defects and medical problems, PTWP providers are one of only a handful of teams in the country able to offer couplet-care rooms, where newborns and mothers can recover together in an intensive-care setting. Our 80-bed NICU is one floor above the women's pavilion for swift transport to our neonatal specialists.

The lobby at Shawn Jenkins Children's Hospital

Additionally, we offer excellent outcomes in **pediatric cancer care**, including bone marrow transplant, **ear, nose and throat (ENT)**, **burn care, and burn reconstructive surgery**. Our **ECMO** program is a platinum ELSO-designated hospital, one of 16 pediatric hospitals globally awarded this achievement. Our telehealth and technology allow you to stay in touch with your patient and our care teams.

We are changing what's possible for patients and families across the country and the world. For more information, visit *musckids.org*. MEH

• To refer a patient, please contact our International Services Team at: *https://muschealth.org/patients-visitors/international-patients*.

References:

1. *https://musckids.org/our-services/heart-center/clinics-and-programs/cardiac-catheterization-program*
2. *https://musckids.org/our-services/heart-center/pediatric-cardiac-intensive-care-unit*
3. *https://muschealth.org/medical-services/womens*

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BEST CHILDREN'S HOSPITALS
U.S.News & WORLD REPORT
RANKED IN 6 SPECIALTIES
2023-2024

The **MUSC Shawn Jenkins Children's Hospital,** located in Charleston, South Carolina, USA, is one of the top-ranked children's hospitals in the Southeast United States. The new 11-floor hospital provides expert care in over 27 pediatric specialties including burn care, cancer, heart surgery, orthopaedics and neurosurgery. Our pediatric heart center is ranked #4 in the United States and achieves among the best outcomes in the nation. To learn more about MUSC pediatric experts, visit **musckids.org**

To refer a patient, please contact our International Services Team at: **muschealth.org/international**

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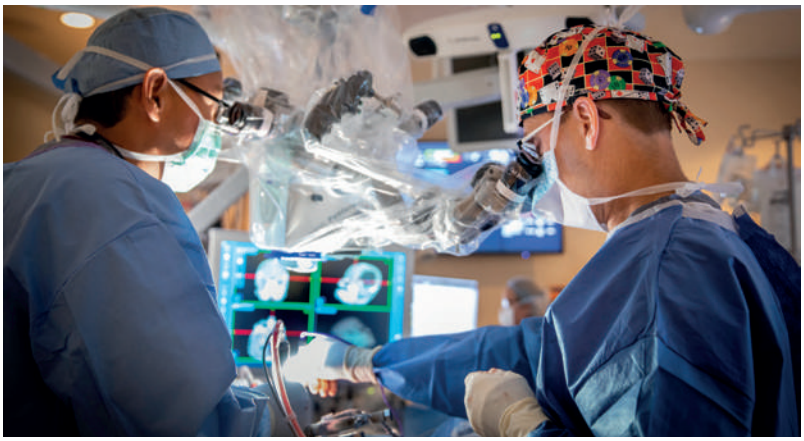


Neurosurgeons Luis Rodriguez, M.D., left, and Matthew Smyth, M.D. Dr. Smyth is chief of the paediatric neurosurgery division at Johns Hopkins All Children's Hospital. His specialties include paediatric neurosurgery, with sub-specialization in paediatric epilepsy surgery and craniofacial surgery with an emphasis on minimally invasive techniques. Additionally, Dr. Smyth is a professor of neurosurgery (PAR) in the Johns Hopkins University School of Medicine. Dr. Rodriguez's practice encompasses the entire range of paediatric neurosurgical problems but his main area of interest is the paediatric spine. He is a charter member of the Pediatric Craniocervical Spine Society and is the director of our Pediatric Neurosurgical Spine Program. This is Dr. Smyth's 100th hemispherotomy.

International Patient Services at Johns Hopkins All Children's

The International Patient Services program at Johns Hopkins All Children's Hospital in St. Petersburg, Florida, emphasizes allowing families to focus on their child's needs while we take care of the rest.

Our team provides personalized concierge service to guide families before, during and after their medical stay in Florida. We can help recommend what to bring, places to stay and what to do in the area if members of the family have free time. We will provide and explain a detailed medical itinerary and guide the family to appointments. We routinely see patients from more than 20 countries, including UAE, Israel, Kazakhstan, Australia and throughout Latin America, providing medical translation, including languages such as Arabic and Spanish.

We offer the medical expertise Johns Hopkins Medicine is known for with teams of paediatric specialists for medically complex conditions. Some specialized areas where we offer world-class care:

- **Brain and Spinal Cord Surgery:** Physician-in-chief George Jallo, M.D., has performed neurosurgery on patients from around the world, including Australia, Brazil, Guatemala and the Middle East. We have one of the busiest epilepsy surgery programs in the Southeast and can take care of the most complex forms of epilepsy. Additionally, our specialists offer selective dorsal rhizotomy, an advanced surgical technique to treat muscle spasticity, and advanced treatments for epilepsy.
- **Cancer and Blood and Marrow Transfusion:** We provide comprehensive care for childhood cancer and blood disorders, including rare conditions not commonly treated at other centres. We offer expertise in advanced bone marrow transplant techniques that make stem cell and bone marrow transplants an option for more children. We use advanced cell processing methods to remove cells that can cause a transplant to fail, while preserving cells that fight infection.
- **Congenital Diaphragmatic Hernia (CDH):** We founded the first inpatient centre in the United States dedicated solely to the treatment of CDH. Infants treated by David Kays, M.D., and the team at Johns Hopkins All Children's experience a survival rate greater than 90% in most cases, which exceeds national benchmarks.
- **Oesophageal and Airway Treatment:** Oesophageal and airway experts Jason Smithers, M.D., and Rusty Jennings, M.D., pioneered innovative techniques for treatment of conditions such as oesophageal atresia and tracheoesophageal fistula. Our team believes every patient should have more than 80 years of good oesophageal and airway function.
- **Heart Surgery and Cardiology:** Our team has experience with treating congenital heart defects (CHDs) from infants into adulthood. Our Fetal Heart program assists in diagnosing CHDs before babies are born and can develop an individualized treatment plan for each child.
- **Newborn and Foetal Care:** Our team has experience providing medical transport for dozens of high-risk pregnant women and newborns, to bring them to the expert care at Johns Hopkins All Children's. We treat more than 100 low and extremely low birth weight babies each year in our neonatal intensive care unit (NICU), which has a Level IV ranking, the highest available from the Florida Agency for Health Care Administration (AHCA). Our neonatology team can call on our CDH, Heart, Intestinal Rehabilitation and other teams for whatever a baby needs. MEH

Vaida travelled from South Australia to Johns Hopkins All Children's Hospital for treatment from Jason Smithers, M.D., a paediatric general surgeon who specializes in oesophageal and airway treatment.

Contact

Highly regarded Tampa International Airport provides an easy route to care at Johns Hopkins All Children's Hospital in nearby St. Petersburg. To refer a patient or to discuss a case with a specialist by phone or videoconference, please call the International Patient Services team at +1-727-767-3047, and we will direct your call as needed. Parents and caregivers can reach our International Patient Services team through the same number.
Visit www.HopkinsAllChildrens.org/International for more.

Dr Paley and experts at Paley Middle East Clinic during the celebration of the first anniversary.

Transforming orthopaedic care in the UAE:

The Paley Middle East Clinic at Burjeel Medical City

The Clinic is accredited as a specialized centre in orthopaedic care by the Department of Health – Abu Dhabi

The Paley Middle East Clinic, located at Burjeel Medical City (BMC) in Abu Dhabi, has emerged as a leader in the region in treating complex orthopaedic conditions. Since its establishment at BMC, the flagship facility of Burjeel Holdings, this clinic has had a profound impact on patients from across the globe.

The Paley Middle East Clinic, alongside Burjeel Medical City and Burjeel Hospital, Abu Dhabi, has recently been accredited as a specialized centre in orthopaedic care in the Emirate by the Department of Health – Abu Dhabi for excellence in orthopaedic care.

Leadership and expertise

At the helm of the Paley Middle East Clinic is Dr Dror Paley, an internationally renowned orthopaedic surgeon known for his expertise in limb lengthening, deformity reconstruction, and joint preservation. Dr Paley is the Founder and Director of the Paley Institute in Florida, USA. His extensive experience and innovative approaches have significantly influenced the clinic's success. He is joined by a team of distinguished orthopaedic consultants, including Dr Michael Uglow, Dr David Feldman, Dr Matthew Dobbs, Dr Claire Shannon, Dr Kaveh Asadi, Dr Katherine Miller, Dr Arun R. Hariharan, and Dr Simone Battibugli. Together, they provide exceptional care to patients at the clinic.

The Paley Middle East Clinic addresses a wide range of orthopaedic conditions including post-traumatic injuries, neuromuscular conditions, developmental and congenital disorders. Its comprehensive range of orthopaedic services includes paediatric orthopaedic surgery, limb lengthening, limb reconstruction, hip dysplasia treatment, and foot and ankle reconstruction surgery. Additionally, it provides expert trauma reconstruction for both adult and paediatric cases, ensuring top-tier care for complex orthopaedic conditions. Since its establishment, the clinic has catered to more than 4,100 patients and performed 509 surgeries.

Dr Paley reflects on the clinic's journey, saying: "Each success story is a testament to the incredible teamwork and commitment to excellence that define our clinic. We remain steadfast in our mission to redefine possibilities in orthopaedic care and continue making a profound impact on the lives of our patients."

Innovations and milestones

Several remarkable cases highlight the clinic's dedication to transformative care. A 15-year-old girl from Egypt, who had previously undergone multiple surgeries, faced a 10cm leg length discrepancy and a deformed hip joint. Dr Paley's expertise in pelvic support osteotomy and intramedullary nail insertion corrected her deformities. Another notable case involved an 18-year-old Emirati boy with Meier-Gorlin syndrome. He underwent intricate limb correction surgeries, showcasing the clinic's commitment to personalized care.

The Paley Middle East Clinic continues to push the boundaries of orthopaedic care through the introduction of advanced surgical techniques. One such innovation is the use of new-generation electromagnetic lengthening nails for bone lengthening. Additionally, the clinic has implemented a guided growth system using plates specifically designed at the Paley Institute in the US.

Dr Uglow, Director of the Paley Middle East Clinic and Consultant Pediatric Orthopedic Surgeon, emphasizes the importance of collaboration, saying: "Our commitment to collaboration enables us to conduct video consultations with patients worldwide and share clinical insights with esteemed partners in the US. This real-time exchange of expertise ensures our patients access the best surgical options promptly."

In 2024, the clinic plans to introduce specialized services, including spinal care, multidisciplinary neuromuscular services, and peripheral nerve treatments. As the Paley Middle East Clinic looks towards the future, it is poised to shape the future of orthopaedic medicine in the Middle East and beyond.

- To learn more about the Paley Middle East Clinic, visit: *https://paleyinstitute.org/paley-middle-east-clinic*

Brain imaging and machine learning reveal six subtypes of depression

A groundbreaking study from Stanford Medicine combines functional MRI with machine learning to identify distinct biological subtypes of depression, paving the way for more personalised treatment approaches.

In a significant advancement towards precision psychiatry, researchers at Stanford Medicine have utilised brain imaging and machine learning techniques to identify six distinct biological subtypes of depression. This novel approach, detailed in a study published in Nature Medicine [1], not only categorises depression into specific 'biotypes' but also predicts treatment responses for three of these subtypes. The findings could revolutionise how depression is diagnosed and treated, potentially ending the current trial-and-error approach to medication prescription.

Addressing the treatment-resistant challenge

Depression remains a formidable challenge in mental health, with approximately 30% of patients experiencing treatment-resistant depression. For up to two-thirds of individuals with depression, current treatments fail to fully alleviate symptoms. This high rate of treatment failure is partly due to the lack of a reliable method for determining which antidepressant or therapy will be most effective for a given patient.

The study's senior author, Leanne Williams, PhD, the Vincent V.C. Woo Professor and director of Stanford Medicine's Center for Precision Mental Health and Wellness, emphasised the urgent need for better treatment-matching methods. "The goal of our work is figuring out how we can get it right the first time," Williams said. "It's very frustrating to be in the field of depression and not have a better alternative to this one-size-fits-all approach."

Methodology and findings

The research team assessed 801 participants previously diagnosed with depression or anxiety using functional MRI (fMRI) to measure brain activity. Scans were conducted both at rest and during tasks designed to test cognitive and emotional functioning. The scientists focused on brain regions and connections known to play a role in depression.

Using a machine learning approach called cluster analysis, the researchers identified six distinct patterns of brain activity among the participants. These patterns formed the basis for the six biotypes of depression identified in the study.

Treatment responses linked to biotypes

In a randomised trial involving 250 of the study participants, the researchers found that certain biotypes responded better to specific treatments:

1. Patients with overactivity in cognitive brain regions showed the best response to venlafaxine (Effexor).

2. Those with higher resting activity in regions associated with depression and problem-solving benefited more from behavioural talk therapy.

3. Individuals with lower resting activity in the brain circuit controlling attention were less likely to improve with talk therapy.

Jun Ma, MD, PhD, from the University of Illinois Chicago and a study co-author, noted that these findings align with current understanding of brain function. The biotype responding well to talk therapy, for instance, may be better equipped to adopt new skills due to higher activity in relevant brain regions.

Implications for precision psychiatry

The study represents a significant step towards personalised medicine in mental health. "To our knowledge, this is the first time we've been able to demonstrate that depression can be explained by different disruptions to the functioning of the brain," Williams explained. "In essence, it's a demonstration of a personalised medicine approach for mental health based on objective measures of brain function."

In a related study [2], Williams and her team showed that using fMRI improves the ability to identify individuals likely to respond to antidepressant treatment. For the 'cognitive biotype' of depression, which affects over a quarter of patients and is less responsive to standard antidepressants, fMRI-based identification increased the accuracy of predicting remission from 36% to 63%.

SCHILLER's new MAGLIFE RT-I enables vital signs monitoring during MRI scan

Monitoring of patients in the MRI environment is not often an easy task, particularly for those under anaesthesia such as children or neonates. Patient monitoring in the MRI room allows physicians to remain informed of changes to the patient's vitals that may otherwise go undetected.

The MAGLIFE RT-1 has been engineered to meet the needs of today's complex MRI environment. With the MAGLIFE RT-1, SCHILLER extends its monitoring range with a complete and innovative device. The MAGLIFE RT-1 performs patient monitoring in an MRI environment, including all necessary vital parameters. The system is designed for all patients: adults, children, and neonates. Use of the MAGLIFE RT-1 is versatile, designed for everyday use, from monitoring under anaesthesia to cardiac imaging.

The MAGLIFE RT-1 allows close monitoring during the examination and can be fully controlled from the MAGSCREEN RT-1 placed outside the Faraday cage. This allows the user to view the patient's vital parameters (curves and values) either in the MRI room, or from the control room. Thanks to the intuitive 15"6 touch screen interface, the user can adjust the display of all vital parameters and functions for a better medical analysis. The MAGLIFE RT-1 demonstrates robustness regarding artefacts allowing it to be placed at 50cm of the MRI machine and used with any MRI systems that have a field strength between 0.2 and 3 Tesla.

What makes this device a cutting-edge monitor is the use of wireless technology for the SpO_2 and ECG sensors. The sensors are easily paired to the device via Bluetooth and are stored in the integrated charging station. This technological innovation for ease of use is more reliable, more robust and is suitable for all type of patients, even premature babies.

Alongside with the ECG and SpO_2, the MAGLIFE RT-1 also monitors other parameters:

- NIBP (standard)
- IBP (optional)
- $etCO_2$, anaesthetic agents, O_2, N_2O (optional)
- Spirometry (optional)
- Temperature (optional)

With the optional spirometry measurement SCHILLER shows itself to be a pioneer. The spirometry option also allows the patient's respiratory mechanics under anaesthesia to be monitored during the MRI examination, in addition to the anaesthetic agent surveillance.

SCHILLER uses direct temperature measurement by optical interferometry. Using this optical measuring principle for temperature guarantees safe operation and immunity to electromagnetic interference.

For the wireless data transmission, the MAGLIFE RT-1 communicates with the remote display unit MAGSCREEN RT-1 via optic fibre, Ethernet, and WLAN, offering a safe Faraday cage penetration.

For a better MRI examination documentation, HL7 and DICOM communication will soon be available, allowing physicians to share the MAGLIFE RT-1 examination data (vital trends) with other hospital medical departments. MEH

MAGSCREEN RT-I

Wireless SpO2 sensor, adult

SCHILLER, an international presence

SCHILLER was founded in 1974 by Alfred E. Schiller. Starting in a four-room flat as a one-man business, the company has become a successful group with around 1200 employees, 30 subsidiaries and a global sales network. Today, SCHILLER is a world-leading manufacturer and supplier of devices for cardiopulmonary diagnostics, defibrillation and patient monitoring as well as software solutions for the medical industry. MEH

Further insights and future directions

The study also revealed correlations between biotypes and specific symptoms and task performance. For example, patients with overactive cognitive regions exhibited higher levels of anhedonia (lack of interest, inability to feel pleasure) and performed worse on executive function tasks.

Interestingly, one of the six biotypes showed no significant differences in brain activity compared to non-depressed individuals in the regions studied. This suggests that there may be other types of brain dysfunction in depression that were not captured by the current imaging approach.

Moving forward

The research team is expanding their imaging study to include more participants and explore a wider range of treatments across all six biotypes. They are also working to establish standardised protocols for implementing this approach in clinical practice.

"To really move the field toward precision psychiatry, we need to identify treatments most likely to be effective for patients and get them on that treatment as soon as possible," Ma emphasised. "Having information on their brain function, in particular the validated signatures we evaluated in this study, would help inform more precise treatment and prescriptions for individuals." MEH

References:

1. Tozzi, L., Zhang, X., Pines, A. et al. Personalized brain circuit scores identify clinically distinct biotypes in depression and anxiety. *Nat Med* (2024). https://doi.org/10.1038/s41591-024-03057-9

2. Williams, L. M., & Yesavage, J. Cognitive control circuit function predicts antidepressant outcomes: A signal detection approach to actionable clinical decisions. *Personalized Medicine in Psychiatry* (2024). https://doi.org/10.1016/j.pmip.2024.100126

MRI-derived brain connectivity networks predict Parkinson's Disease progression

A new study suggests that MRI-derived brain connectome data can forecast the progression of brain atrophy in early-stage Parkinson's disease patients, potentially offering a valuable tool for intervention trials and personalised treatment approaches.

Connectome mapping predicts grey matter atrophy

Researchers from the IRCCS San Raffaele Scientific Institute in Milan have demonstrated that structural and functional brain connectivity patterns, as revealed by MRI, can predict the progression of grey matter atrophy in patients with mild Parkinson's disease. The study, published in Radiology [1], utilised MRI data from 86 patients with mild Parkinson's disease and 60 healthy control participants to generate a connectome – a comprehensive map of neural connections in the brain.

The team developed an index of disease exposure based on the connectome data and found that disease exposure at one and two years correlated with atrophy at two- and three-years post-baseline. Models incorporating disease exposure successfully predicted grey matter atrophy accumulation over three years in several brain regions.

Implications for disease progression theory

The findings lend support to the theory that functional and structural connections between brain regions play a significant role in Parkinson's disease progression. Professor Federica Agosta, associate professor of neurology at the Neuroimaging Research Unit of IRCCS San Raffaele Scientific Institute and study co-author, explained: "The loss of neurons and accumulation of abnormal proteins can disrupt neural connections, compromising the transmission of neural signals and the integration of information across different brain regions."

This disruption of neural connections may be a key factor in the spread of alpha-synuclein, the protein that accumulates in misfolded clumps inside nerve cells in Parkinson's disease, forming structures known as Lewy bodies and Lewy neurites.

Potential for personalised intervention

The study results suggest that MRI could play a crucial role in intervention trials aimed at preventing or delaying disease progression, particularly when individual patient information is incorporated into the model. Prof. Agosta emphasised the importance of considering individual variability in disease progression: "We believe that understanding the organisation and dynamics of the human brain network is a pivotal goal in neuroscience, achievable through the study of the human connectome. The idea that this approach could help identify different biomarkers capable of modulating Parkinson's disease progression inspires our work."

Global impact of Parkinson's disease

The significance of this research is underscored by the growing prevalence of Parkinson's disease worldwide. According to the World Health Organisation, the disease affects more than 8.5 million people globally, with prevalence doubling in the past 25 years. Parkinson's disease is characterised by tremors, slowness of movement or rigidity, with symptoms worsening over time and potentially including cognitive impairment and sleep problems.

Future directions

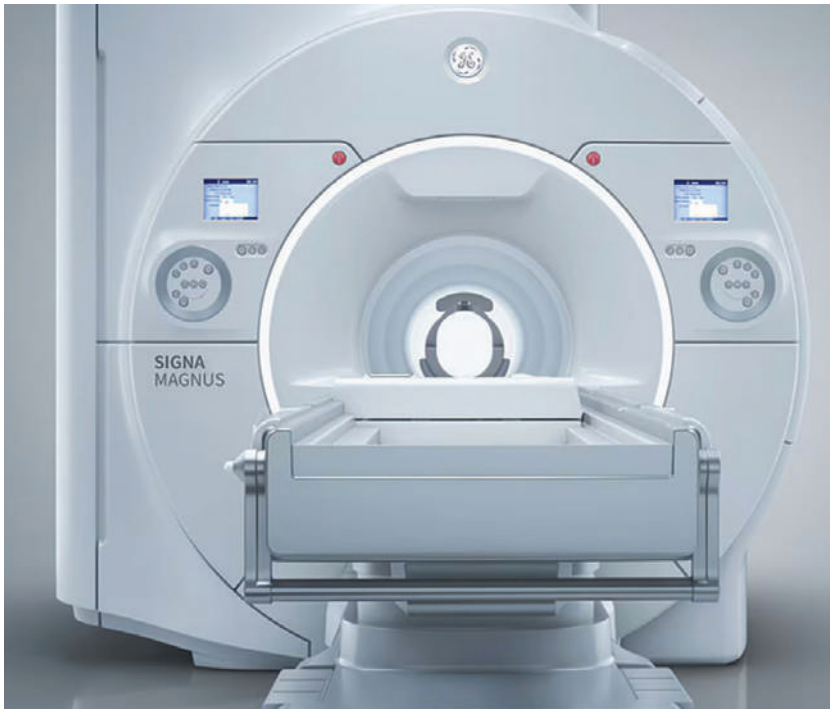
While the current study provides valuable insights into the potential of connectome mapping for predicting Parkinson's disease progression, future research should focus on developing models that consider different starting conditions and incorporate individual-specific information for optimal effectiveness. This approach could lead to more personalised and effective interventions for patients with Parkinson's disease.

Reference:

Basaia, S., Sarasso, E., Balestrino, R., et. al. Brain Connectivity Networks Constructed Using MRI for Predicting Patterns of Atrophy Progression in Parkinson's Disease. Radiology. *Radiology*, 25 June 2024. https://doi.org/10.1148/radiol.232454

Groundbreaking head-only MRI scanner unveiled by GE HealthCare

GE HealthCare has introduced SIGNA MAGNUS, a novel head-only magnetic resonance imaging (MRI) scanner designed to advance neuroscience research. The device, which is currently pending FDA 510(k) clearance (it is not yet CE marked), aims to overcome the performance limitations of conventional whole-body MR systems that have historically constrained neurological and psychiatric research.



Addressing the neurological disorder burden

With 43% of the global population affected by neurological disorders, there is a pressing need to expand the neurological clinical applications of MRI. SIGNA MAGNUS represents GE HealthCare's most advanced 3.0T MR imaging device, specifically engineered for high-standard neurological and oncological research in head-only imaging.

Technical specifications and capabilities

SIGNA MAGNUS boasts superior gradient performance through its HyperG gradient technology, featuring 300 mT/m and 750 T/m/s. This enables the detection of previously unattainable fine details. The system's innovative asymmetric gradient design allows for exceptional diffusion performance, achieving extremely high B-value diffusion with short echo times (TEs), which enhances the understanding of neural architecture.

Potential for research advancement

The device is designed to push the boundaries of advanced anatomical, diffusion, and functional techniques. It is augmented by GE HealthCare's latest deep-learning algorithms, potentially uncovering new parameters and biomarkers for neurological research.

Kelly Londy, CEO of MR GE HealthCare, said: "With SIGNA MAGNUS, we are not just exploring the possibility of providing the tool; we are setting new benchmarks in medical research and future clinical patient care. This innovation underscores our commitment to R&D and our collaborations with academia, pushing the boundaries of what's possible in MR imaging. The potential impact of SIGNA MAGNUS on patient outcomes and our understanding of the human brain is profound."

Collaboration with leading research institutions

In March 2024, an investigational MAGNUS system was installed at Brigham and Women's Hospital, a prominent research institution. The Brigham team will collaborate with GE HealthCare in conducting research on high-performance neuro MR.

Implications for future research and patient care

SIGNA MAGNUS represents a significant step forward in neuroimaging technology, potentially empowering neuroscientists, neurologists, neuroradiologists, and oncologists to transcend current barriers in diagnosis, understanding, and treatment of complex neurological and psychiatric diseases.

The system's advanced capabilities may facilitate more in-depth exploration of brain microstructure, microvasculature, and function. This could lead to improved diagnostic accuracy and enhanced understanding of conditions such as Alzheimer's disease and other neurological disorders that have remained challenging to diagnose and treat effectively.

Upgradeability and cost considerations

GE HealthCare has designed SIGNA MAGNUS with upgradeability in mind. Many of their existing 3.0T systems can be upgraded to SIGNA MAGNUS, potentially reducing capital costs for healthcare institutions and research facilities. MEH

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