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THE OFFICIAL MAGAZINE OF THE ARAB HEALTH EXHIBITION



AFRICA HEALTH 2018:

Explore innovations, Increase Business Opportunities

SPECIAL REPORT: PAEDIATRICS

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GENE THERAPY - STRIMVELIS

Ospedale San Raffaele is the only hospital in the world which currently can treat with gene therapy adenosine deaminase-deficient severe combined immune deficiency (ADA SCID), better known as 'bubble babies' syndrome. Strimvelis is the first life-saving treatment in the world using ex vivo gene therapy for ADA SCID.

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Our cardiology and cardiac surgery department is the most important in Italy and one of the most highly experienced centre in Europe specialized in congenital heart disease. We take care of patients affected by complex heart defects from birth to adulthood, providing them the most innovative techniques of cardiac surgery and interventional cardiology. GSD has the only center in the world for the treatment of Brugada syndrome.

ONCOLOGY

The Group staff works very closely to create a well-integrated multidisciplinary team (Surgery, Oncology, Diagnostic Radiology, Radiotherapy, Nuclear Medicine, Pathology, Oncological Psychology, Plastic/Reconstructive Surgery). At San Raffaele, which is our biggest facility, there are approximately 9000 hospitalizations for tumors each year (approx. 17.2%), with 6000 tumor surgeries (approx. 30%). Every week, a multi-specialty team meets to set up a diagnostic and therapeutic pathway for every patient.

ORTHOPAEDICS

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THE OFFICIAL MAGAZINE OF THE ARAB HEALTH EXHIBITION

Peter Hall

President, Global Exhibitions EMEA

peter.hall@informa.com

Publications Director Joseph Chackola

joseph.chackola@informa.com

Contributing Editor Sangeetha Swaroop

Sangeetha.C.Swaroop@informa.com

Contributing Writer Inga Stevens

inga.stevens@informa.com

Creative Director Mark Walls

mark.walls@informa.com

Print Media Sales Roshal Solomon

Roshal.Solomon@informa.com

Digital Media Sales Ayush Agarwal

Ayush.Agarwal@informa.com

Digital Services Manager Ali Khan

Ali.Khan@informa.com

Editorial Consultants

Frost & Sullivan

Printed by

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Letter from the editor

Upbeat about Africa Health

Having experienced stellar growth over the last decade and showing no sign of slowing down in the near future, Africa is poised for \$25bn-\$30bn in investment by 2022 in physical healthcare assets alone. Once a predominantly import market characterised by low-value manufacturing, the healthcare landscape across the continent is witnessing a transformation with the emergence of advanced technology and new approaches to healthcare management.

Discover how digital disruption is helping tackle local healthcare challenges at Informa Life Sciences' 2018 Africa Health Exhibition & Congress taking place at Johannesburg, South Africa, from 29th to 31st May. Speakers at the Congress write in this issue about how technology is enhancing the capabilities of healthcare systems in the region.

Our Special Report on Paediatrics highlights some of the key advances in several areas of paediatric medicine and offers commentaries on the etiologies and treatment of life-threatening diseases of children.

Dubai Health Authority also unveils details of its Innovation Centre that seeks to foster healthcare innovation with private sector collaboration.

We hope you have a productive and exciting show at Africa Health. Meanwhile, wish you all Ramadan Kareem!



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contents

AFRICA HEALTH EXHIBITION & CONGRESS 2018

- 6** Africa Health 2018: Explore innovations, Increase Business Opportunities
- 10** Healthcare in Sub-Saharan Africa: What are the answers?
- 14** 'Africa Health will provide an opportunity to showcase real investment opportunities to potential investors': Interview with Hon. Sarah Opendi, State Minister for Health, Uganda
- 16** Digital Future of Healthcare
- 18** Using technology in the healthiest manner possible
- 20** Accelerating and Scaling Digital Health in LMICs: Government Leadership is key
- 22** The management of potential tetanus exposure in the Emergency Department
- 23** Medical malpractice litigation: Undermining South Africa's health system

SPECIAL REPORT: PAEDIATRICS

- 26** Paediatric magnet ingestion: Risks, management, and complications
- 28** Cincinnati Children's Hospital Medical Center: Novel immunotherapy research study targets aggressive pediatric cancers
- 30** Nemours Alfred I. duPont Hospital for Children: A promise to children and families around the world
- 32** Advanced health informatics system improves patient care at Children's Cancer Hospital Egypt
- 34** Nationwide Children's Hospital: An Upstart on the Global Stage. A Consistent Leader in the U.S.
- 36** Cook Children's: Life-changing brain surgery gives South American boy a brighter future
- 38** UChicago Medicine: UChicago Medicine certified to offer breakthrough CAR T-cell gene therapy
- 40** Lurie Children's Hospital of Chicago: Kuwait family turns to Lurie Children's for specialized care

EMERGENCY MEDICINE

- 44** Risk Management in the Emergency Department
- 48** The importance of standardised field medical data gathering during humanitarian disasters

HEALTHCARE INNOVATION

- 52** Innovation Centre to promote healthcare innovations

HEALTHCARE INVESTMENT

- 54** Investment opportunities in the healthcare sector in Dubai

ARTIFICIAL INTELLIGENCE

- 56** The double-edged sword of AI and machine learning on healthcare data security
- 60** The New Penicillin – Improving Patient Outcomes with AI and Advanced Analytics

HEALTHCARE MANAGEMENT

- 62** Managing a Hospital is No Child's Play

AFRICA HEALTH 2018:

Explore Innovations, Increase Business Opportunities

By Arab Health Magazine Staff



Expected to attract more than 10,100 healthcare professionals and over 553 leading international and regional healthcare and pharmaceutical suppliers, manufacturers and service providers, the 8th annual Africa Health Exhibition & Congress will be held at the Gallagher Convention Centre, Johannesburg, from 29 – 31 May 2018.

Africa Health is the largest platform on the continent for international and local companies to meet, network and do business with the ever-growing African healthcare market.

Having experienced stellar growth over the last decade and showing no sign of slowing down in the near future, the African region is seen to be one of the most sought-after markets globally for healthcare investments. According to a report by the IFC, the private-sector arm of the World Bank, titled 'Health Care in Africa: IFC Report Sees Demand for Investment', it is estimated that by 2022, Africa will need \$25bn-\$30bn in investment in physical healthcare assets alone, including hospitals and clinics. The report also states that as Africa's economies

“This is a beautiful platform where we meet and network with people who provide tech solutions for health, academics and healthcare managers.”

Hon Minister Dr Bernard Hauku, Minister of Health, Windhoek, Namibia

improve, the demand for good quality healthcare will only increase further.

Digital Transformation

According to Ryan Sanderson, Exhibition Director at Informa Life Sciences Group Africa – organisers of Africa's largest healthcare conference, Africa Health – the pressure to identify real solutions for Africa's healthcare challenges should be a critical consideration for any entity looking to invest in the region.

Sanderson says that with high levels of mobile penetration on the continent, coupled with advancing technologies and new approaches to healthcare management, digital transformation within the healthcare sector may be one of the solutions to addressing the challenges faced, particularly in rural parts of Africa.

As the largest healthcare business

platform in the MENA region, Africa Health is the perfect venue for exhibitors to showcase their latest products and services to an engaged audience that are looking for new business opportunities. It also serves as an excellent platform for both visitors and exhibitors to stay abreast of the industry's latest trends and advancements, meet new customers and develop relationships with existing clients.

CPD-accredited conferences

In addition, the event will run the Africa Health Congress which will feature a total of 16 conferences with the opportunity to gain CPD credits for selected tracks. These multidisciplinary conferences will offer education on the latest updates, trends and advancements on a range of clinical and non-clinical topics. The clinical

conference listing will include surgery, nursing, medical obstetrics, emergency and trauma. Non-clinical conferences will consist of decontamination & sterilisation (CSSD), public health, healthcare management, procurement, etc. amongst others.

The exclusive Africa Health Leaders Forum will highlight the importance of Public-Private Partnerships (PPP) in enhancing the capabilities of healthcare systems in the region.

The Congress will host distinguished local and international experts and industry leaders speaking across the different conferences. Their presentations will touch upon key issues affecting the healthcare sector, including:

- Opportunities for investment in healthcare start-ups in Southern Africa
- Water saving and efficiency in health facilities
- Making nurses techno savvy

“All the key international industry players are at Africa Health... It is important for industry professionals to attend Africa Health to stay up to date with technology, as it is a great platform to view innovation in the healthcare field.”

Douglas Austen, Business Unit Manager, Obsidian Health

- Planning and managing healthcare technology across the lifecycle of healthcare facility
- Community-lived experiences of climate change in relation to energy sources
- The impact of political decisions on healthcare
- Telemedicine: Providing remote access to high quality care

Sanderson says that, year-on-year, Africa Health continues to cement its position as a leading platform for dialogue around the

most pressing healthcare issues that the continent faces. “Finding solutions to these challenges will not only result in greater access to health services for those who need it the most, but it will, in turn, reduce the financial burden that all governments experience when trying to meet their nation’s healthcare needs.”

All proceeds from the conferences will be donated to local charity, RuDASA (The Rural Doctors Association of Southern Africa) and associations.

AFRICA HEALTH CONGRESS OVERVIEW

BIOMEDICAL ENGINEERING NEW (30th May)

In partnership with: IFBME, IBE and US

Theme: Past, Present and Future of BME in Africa

This session commences with a plenary address on ‘The West African Biomedical Engineering landscape - an update, review, lessons to be learnt and thoughts for the future’. Attendees at the event can explore initiatives that accelerate medical device innovation and manufacturing while also considering the role of biomedical engineering societies within Africa.

DECONTAMINATION & STERILISATION (CSSD) (29-31 May)

In association with: CSSD Forums of South Africa (CFSA) & Association for Peri-operative Practitioners in South Africa (APPSA – Gauteng Chapter)

Theme: Best practice – best outcomes

This conference helps to gain more insight into CSSD in perioperative environments and advance knowledge in this niche area. It will examine new strategies to decrease risk of contamination, increase efficiency and reduce cost of handling instruments while also identifying sources of CSSD failures and develop risk management to control errors.

EMERGENCY MEDICINE NEW (31st May)

In partnership with: Emergency Medicine Society of South Africa (EMSSA)

Theme: Addressing and advancing emergency care in South Africa

Assessing the future of emergency care in South Africa’s healthcare system to help stay ahead of the curve, this conference session enables participants to determine the best course of action in advanced paediatric emergencies to improve patient outcomes. First-hand case examples are reviewed to tackle ways to improve response in tough situations in the ED.

ETHICS, HUMAN RIGHTS AND MEDICAL LAW (31st May)

Theme: Managing medical negligence and medical errors in South African hospitals & human rights issues surrounding human migration in Africa

This agenda will delve into the recurrent problems of medical negligence in clinical practice, as well as the ethics of human migration, in light of the impact of ‘brain drain’ and recent events surrounding the migration of African youth to Europe and elsewhere; and the duty and burden these two issues have placed on healthcare practitioners and other members of the civil society on the continent.

HEALTHCARE MANAGEMENT (30-31 May)

Theme: Digital health revolution: Delivering high quality care to every patient in Africa in a sustainably affordable way

Incorporating digital disruption into the healthcare market to deliver top-tier quality service at low cost is a key topic of discussion at this conference. The two-day session investigates the role of digital health in creating health equity and improving healthcare access to patients, and also compares the latest digital platforms to enable attendees to make the right investment decision.

HEALTHCARE TECHNOLOGY LIFECYCLE MANAGEMENT (31st May)

In association with: IFBME, SAHTAS & CEASA
Theme: Energising healthcare through practical solutions

This session offers an evaluation of the parameters of strategic medical equipment planning, management and maintenance to improve efficiency and productivity in any healthcare organisation. It looks at the role of state-of-the art medical technologies in enhancing the efficiency and management of a facility. ►

HOSPITAL BUILD (30-31 May)

Theme: Starting with the end in mind

Apart from discussing financing options and challenges in the healthcare build environment, this conference also explores contemporary design and fit-for-purpose healthcare facilities to maximise efficiency and patient experience. Participants can assess the latest resource management strategies in healthcare facilities and prioritise cost-cutting to improve efficiency.

IMAGING AND DIAGNOSTICS (29-30 May)

Theme: Techniques and technology towards imaging excellence

Chaired by Prof Sudhir Vinayak, President, African Society of Radiology, this session examines the impact of new initiatives that prevent occupational exposure in radiology. It also looks at new developments and the latest techniques for accurate diagnosis in various imaging specialities – cardiac, neuro, breast, abdominal, paediatric, and obstetrics & gynaecology.

NURSING (31st May)

In association with: Academy of Nursing in South Africa (ANSA)

Theme: Changing the game with technology

How does the application of modern technology affect the nursing profession? This conference helps you discover how technology can take nursing to the forefront of healthcare by improving care and patient outcomes, and how to include technology in nursing training and education to develop tomorrow's nurses. Learn also about unified health systems used by nurses to improve patient flow and experience.

MEDICAL OBSTETRICS (29-30 May)

Knowledge Partner: Faculty of Health Sciences, University of the Witwatersrand

Theme: Best practice in medical obstetrics

Speakers at this conference discuss the best treatment strategy for common chronic diseases encountered during pregnancy that will help reduce negative outcomes. The agenda will familiarise obstetricians and healthcare providers with recent developments in obstetrics with the aim of enhancing scientific knowledge on current controversies and other clinically relevant topics. Speakers will also cover current issues in obstetrics such as obesity, hypertension, pulmonary complications, advanced maternal age, screening and more.

MEDICAL DEVICES PROCUREMENT (29th May)

In partnership with: Medical Devices

Manufacturers Association of South Africa ()

Theme: Procurement by Africa for Africa

This conference will help you discover quality and cost-effective procurement strategies to increase savings within any healthcare institution. It also explores new technology, initiatives and opportunities supporting the procurement of medical devices within Africa and, identifies and evaluates new medical device procurement regulations to ensure compliance.

PUBLIC HEALTH (29-30 May)

In partnership with: Public Health Association of South Africa

Theme: Think Global, Act Local

From reviewing strategies to improve leadership and clinical governance to evaluating the impact of climate change on health, this conference is a must-attend event for anyone associated with the public health sector across Africa. The conference helps identify the prevalence of occupational disease and injuries, and also discusses the development of new vaccines for the treatment and prevention of infectious diseases.

QUALITY MANAGEMENT (29th May)

In association with the Council for Health Service Accreditation of Southern Africa (COHSASA)

Theme: Ensuring a resilient approach to a high quality of care

What steps need to be taken to ensure high quality of care in health systems? This session outlines innovative approaches to improve quality, discusses tools and techniques for improvement and provides insight into standardising care by implementing improvement standards across the organisation.

SURGERY (29th May)

Theme: Future of surgery in Africa

This session discusses the role of new technology and current treatment strategies to minimise human error in surgical care, compares treatment options and practice standards for benign and malignant breast disease, identifies how to manage complications in MIS and GI cases, and determines good practice in laparoscopic emergency procedures that reduce the risk of post-operative complications.

TRAUMA (29-30 May)

In partnership with: Trauma Society of South Africa

Theme: Advancing the expertise of the practicing trauma physician

Participants at this conference session can learn about best practices when dealing with advanced and severe trauma cases to enable faster recovery time, lower infection rate and overall better outcomes. This includes reviewing local multidisciplinary trends for trauma care and identifying how to efficiently manage trauma cases within the peripheral hospital.

AFRICA HEALTH LEADERS FORUM (31st May)

Theme: Harnessing PPPs in Healthcare - Imperatives for today's leaders

This invitation-only event includes keynote addresses by prominent health ministers from across Africa and private health specialists in the field to discuss the rise and challenges associated with Public-Private Partnerships (PPPs) which governments are utilising as a means of gathering investment and expertise from the private sector to enhance the capabilities of healthcare systems. **AH**





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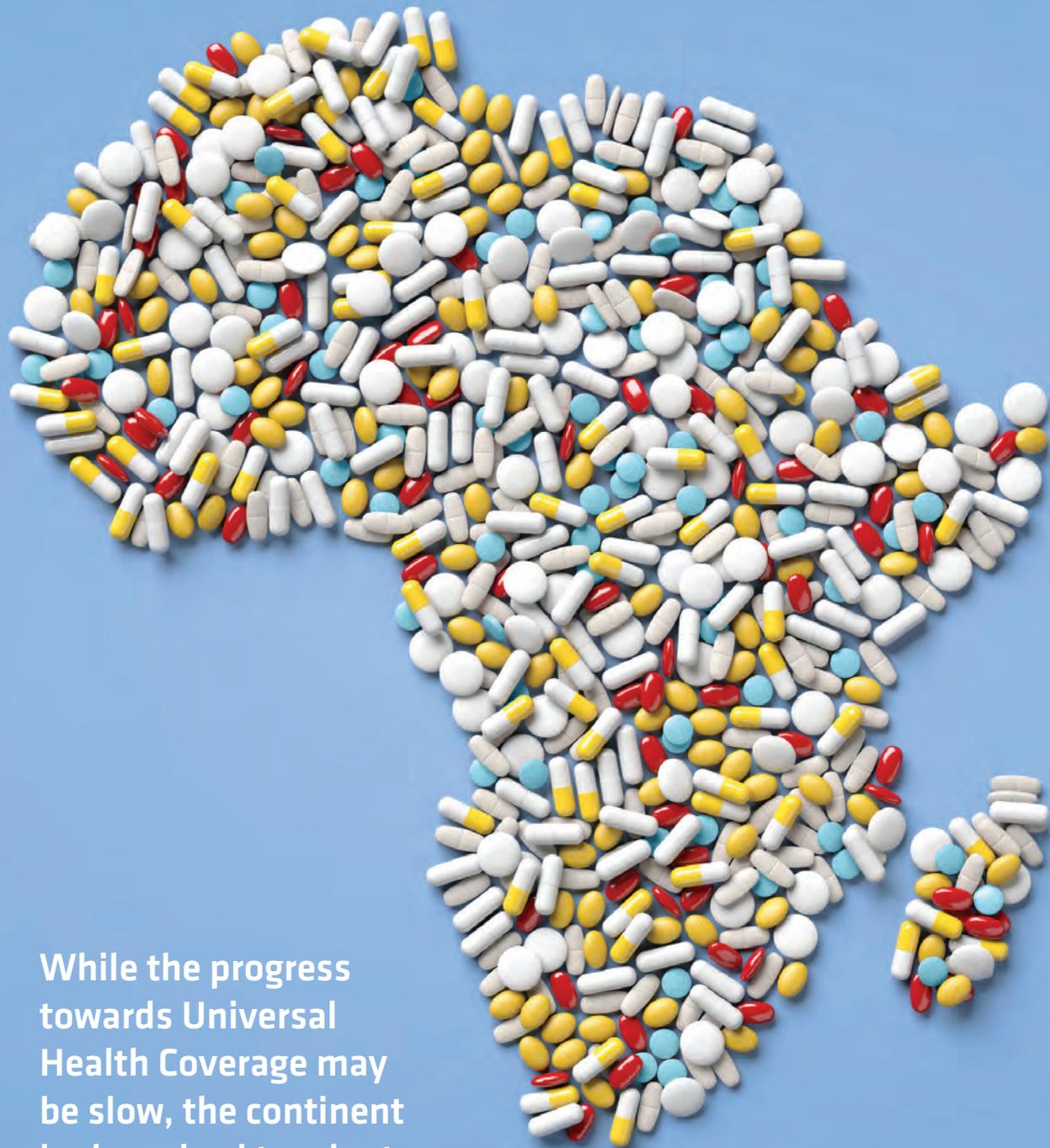


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While the progress towards Universal Health Coverage may be slow, the continent looks poised to adopt localised solutions for very regional problems

Healthcare in Sub-Saharan Africa: **WHAT ARE THE ANSWERS?**

By Inga Louisa Stevens, Contributing Writer

For a continent that accounts for 25% of the world disease burden, the healthcare space in Sub-Saharan Africa requires holistic approaches across several verticals to attract the required investment to tackle the growing challenges across the region. According to a report by the IFC, the private-sector arm of the World Bank, it is estimated that by 2022, Africa will need US\$25 billion - US\$30 billion in investment in physical healthcare assets alone, including hospitals and clinics.

Analysis by Frost & Sullivan suggest that, generally, the growth of the Sub-Saharan Africa healthcare market for 2018-2019 will be hampered by the slow down in economic growth across the continent (an average of between 4% and 6%). While this has an effect in multiple areas, this has seen smartphone sales growth reduce from double to single digits since 2016 and will have a direct effect on mHealth, for example.

"Despite this, healthcare spending is expected to continue increasing in both public and private sectors, assisted by global aid organisations," says Takudzwa Musiyarira, who is a healthcare research analyst for Middle East and Africa at Frost & Sullivan. "Over the next year, the market for chronic disease pharmaceuticals will see double digit growth through an increase in government funded diagnostic and prevention initiatives (mainly diseases such as diabetes, hypertension and cancers). Disease prevalence has grown due to an increase in unhealthy lifestyles, and limited treatment."

As such, there are several areas of the healthcare market in Sub-Saharan Africa that will remain the focus for investment, both from the public and private sectors. Localised solutions, coupled with foreign expertise, will offer much needed answers to the ongoing issues in the regional healthcare space.

Sustainable development goals and universal health coverage

The Sustainable Development Goals (SDG) adopted by the United Nations General Assembly in September 2015 have targets that relate to health. In particular, Goal No. 3 focuses specifically on ensuring healthy lives and promoting well-being for all at all ages. Target 3.8 of SDG No. 3 - which addresses achieving universal health coverage (UHC), including financial risk protection, access to quality essential healthcare services and access to safe, effective, quality and affordable essential medicines and vaccines for all - is the key to attaining the entire goal as well as the health-related targets of other SDGs.

As Musiyarira explains, while the SDGs were established in 2015, in Sub-Saharan Africa, significant but slow progress has been made in meeting them over the past 15 years, particularly poverty reduction.

"Food insecurity is on the increase due to high population growth rates, and low agricultural output. This has a negative impact on the battle to reduce undernourishment. On the positive side, access to and use of contraceptives in Sub-Saharan Africa have increased," Musiyarira says. "Maternal and child mortality have reduced drastically in the last 15 years, by over 30%, although the continent is still the highest in the world."

Limited healthcare infrastructure has also negatively affected the ability to meet the health SDGs, particularly in rural Sub-Saharan Africa, adds Musiyarira. As such, he says it is still a long road ahead in the journey to meet SDGs by 2030. Emerging African economies will likely meet some of the SDGs quicker due to targeted initiatives by governments and faster economic growth.

Universal health coverage has had slow but positive growth. To date only Rwanda has managed to achieve UHC of over 90% in Sub-Saharan Africa. According to Musiyarira, this

has been due to its community-based insurance programme targeting the lower income bracket of the population which has had a direct effect in decreasing mother and child mortality, and a rise in the number of skilled birth attendants.

"Financing of UHC has been the major drawback in implementing and increasing coverage in most nations. This has resulted in countries such as South Africa experiencing delays in rolling out UHC. However, it is expected that there will be significant progress made over the next year in establishing relevant regulations in Sub-Saharan Africa, which is the first step in UHC rollout," adds Musiyarira.

Russo G et al. (2017) echo this sentiment in their article titled 'Universal health coverage, economic slowdown and system resilience: Africa's policy dilemma' published in *BMJ Global Health*. They say that there is a need to consider how the health system can withstand and be resilient in the face of an economic slowdown or contraction while still striving to expand access and services. Russo G et al. also highlight that policies are needed to bring the different ways health services are provided in resource-scarce settings under the broad vision of UHC.

mHealth: Driving investment

mHealth presents a significant opportunity in Sub-Saharan Africa where basic access to healthcare is a challenge. Not only can mHealth improve the current healthcare system, but it can provide healthcare to those populations living in remote areas across the region. Increasing mobile access, coupled with better quality networks and the introduction of healthcare apps and other mobile healthcare services are set to make remarkable improvements on the road to achieving the SDGs.

"While Sub-Saharan Africa has a high mobile penetration rate (80%), smartphone usage has been relatively low due to the traditionally high preference for cheaper feature phones. However, smartphone and ▶

Internet (particularly mobile) penetration are slowly growing due to cheaper Chinese models entering the market and more affordable connectivity options. This will have a positive impact on the growth of mHealth which had been focused less on the Internet and more on using SMS and USSD methods via feature phones,” says Musiyarira.

Meanwhile, consumer application usage, through fitness and health trackers, is only popular in urban areas and will continue to rise as the middle class in Sub-Saharan Africa grows. However, according to Musiyarira, medical grade apps and wearables are becoming more preferred globally as they offer real benefits and mHealth will play a tremendous role in achieving SDGs through the proliferation of mobile services in various economic sectors.

One such platform is TalktomeDoc, a telehealth platform from Nigeria. Driven by the desire to ensure healthcare is cost effective, affordable, easy to reach and convenient to use while ensuring that healthcare spending by health facilities is reduced while maximising profit, their platform makes it possible for several medical service providers to converge and give comprehensive healthcare to everyone. The platform makes consultation and diagnosis easily accessible to patients who are normally beyond the reach of medical specialists due to location.

Similarly, MedAfrica app, a product of Nairobi-based Shimba Technologies, offers direct access to health information and services. With this app you can search, filter and view health information and services near you even when offline as well as connect with doctors on the go. Other services include hospitals, diagnosis, symptoms, nutrition, drugs, first aid, insurance and fitness. Med Africa personalises your health services by frequency of use.

Riding the wave of Public-Private Partnerships

A May 2017 report from the India-Africa Partnership, between the African Development Bank (ADB), the Health Systems Research India Initiative (HSRII) and the University of the Witwatersrand (Wits) based in Johannesburg, South Africa, found that Public-private partnerships (PPPs) in healthcare financing and delivery offer significant opportunities for accelerated improvements in health service access in fast-developing economies such as those found in Africa.

While the overall idea of the report was



always to explore the potential for health-related PPPs in Africa, the central question examined in the report was how to achieve this. It said: “Having governments partner with the private parties in the achievement of public goals is an important means to leverage public interventions to achieve results that would otherwise not be possible if pursued exclusively by public sector actors – at least in the medium to long term. While PPPs remain only one strategic option amongst many in the achievement of UHC, they are likely to become a permanent feature of any modern growing and accountable health system.”

Musiyarira agrees: “PPPs will continue to be the main business model for delivery of healthcare due to the mostly public nature of healthcare initiatives. PPPs will be particularly effective in the establishment or upgrading of healthcare infrastructure. On average, only 5% to 20% of healthcare in SSA is in the private sector. It is expected that by 2030, as Sub-Saharan African markets become more mature and after the roll out of UHC, other funding models will emerge enabling greater commercialisation, thus putting innovation into overdrive. Africa has suffered from ‘pilotitis’ due to lack of funding, thus hindering credible innovations from commercialising, particularly in mHealth.”

A hub for innovation for medical diagnostics

Sub-Saharan Africa requires cost-effective, easy-to-manufacture healthcare solutions to address the unique challenges on the continent. Traditionally, innovative medical devices have been developed abroad and imported into the region. However, with investment in localised Research & Development (R&D), local companies are now beginning to develop ground-breaking ideas in response to the medical needs of the continent.

As Musiyarira explains, over 80% of Sub-Saharan Africa's medical device market is serviced by imports from mainly North America, Europe, China and Japan. Thus, he says, there is a huge opportunity for import substitution through increasing local manufacturing capacity. “Investing in the production of high value medical devices such as imaging equipment will be beneficial to the continent and will add export opportunities, reducing the trade deficit and be able to compete on the global stage. However, investment in Research & Development will be key in realising this goal!”

Exchange rate volatility has negatively impacted imports, thus making devices more expensive locally, due to weakening currencies against the US dollar over the past decade. “Local manufacturing will minimise this risk and will be supported by intra-Africa trade agreements. There will continue to be a high preference for low tech products and consumables for local manufacturers in the next few years, and portable devices to service inaccessible communities,” says Musiyarira.

Today, we are seeing great examples of local companies bucking the trend by using innovative technology to manufacture solutions across the medical device spectrum.

One example is Cape Town-based BioTech Africa who are specialists in recombinant protein production and bioprocessing services driven by the global requirement for improved in vitro diagnostics. Their current range of highly purified recombinant proteins are used in the manufacture of diagnostic test kits for point of care rapid diagnostics, and research institutions. They offer a variety of protein expression platforms along with a host of other protein services, including protein refolding and structural biology analysis. With their proprietary technology, they are able to deliver highly stable and functionally active recombinant proteins. **AH**

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'Africa Health will provide an opportunity to showcase real investment opportunities to potential investors'

By Arab Health Magazine Staff

Speaking ahead of the 2018 Africa Health Exhibition & Congress scheduled to be held from May 29 to 31 at Johannesburg, South Africa, Hon. Sarah Opendi, State Minister for Health, Uganda, says in an interview with *Arab Health Magazine* that as an educated and growing middle class demands better quality healthcare, the major health market segments likely to expand across Africa are the pharmaceutical industry, speciality healthcare, infrastructure development, insurance, and diagnostics and laboratory. "Africa Health will therefore help to attract foreign direct investment in these sectors," she adds.

Excerpts from the interview:

1. What are the top healthcare market predictions for Africa in 2018-19?

One of the main predictions for the African healthcare market in the year ahead is that the market will embrace technologies and innovations that can improve efficiency and access to healthcare like, for example, e-health.

We will also see the region give greater focus on affordable national health insurance to reduce out-of-pocket expenditure. One outcome of this is that most economies will embrace Public Private Partnerships to achieve universal health coverage, leading, in turn, to increased affordability of specialised care.

The year ahead will also see greater priority given to manufacture of pharmaceutical production.

Although majority of countries will continue to focus on communicable diseases such as HIV/AIDS, Malaria and TB in 2018-2019, major financing disparities will continue in comparison to disease

"The health sector in Uganda is ready for large capital investment. The Government of Uganda has provided a conducive environment for foreign direct investment in the form of subsidies and market incentives, as well as a stable political and macroeconomic environment."

burden as Africa accounts for over 11% of the global population; almost 25% of the global disease burden; just 1% of the global healthcare resources and only 3% of the global health workforce.

2. What are the key trends and growth opportunities affecting the African healthcare market? What are the major challenges as well as growth opportunities that you foresee in the immediate future?

Throughout Africa, we are currently witnessing an epidemiological shift with increased non-communicable diseases and life expectancy. As the purchasing power of the population is improving, countries are focusing on Public Private Partnership models in healthcare. Development partners are now moving towards impact financing from mainstream aid and the region is also investing in large health infrastructure developments.

Africa is characterised by an unmet need for specialised services and diagnostics. However, the growing availability of a skilled workforce to deliver quality healthcare across the region is a promising trend.

In addition, healthcare innovations are

emerging as a key enabler of care delivery, and opportunities exist in digital health systems by using mobile phones as drivers for better healthcare outcomes.

Growth opportunities abound in several sectors in the healthcare industry. Chief amongst these are: health infrastructure, pharmaceutical production, laboratory and diagnostics, support sectors including water and energy, e-Health, healthcare insurance, specialised healthcare, and financial services such as private equity.

However, the expansion of these market segments is not without its challenges. Africa, as a whole, has its unique set of challenges as systemwide barriers impede healthcare delivery in the region. Some of the chief obstacles that prevent African countries from achieving better results include the lack of large capital investments, unaffordable healthcare, unpredictable political environment in the region, and the gradual transition from donor aid.

3. What, according to you, are some of the practical steps African countries can take to improve their national health systems?

There is no denying that fundamental changes

must occur within the African health system to bring about improved care in a real and substantial way. First and foremost, we need to strengthen national systems in terms of public expenditure management, governance, leadership and accountability. Sustainable financing of health can be ensured by making more deliberate and innovative ways in increasing domestic sources.

Embracing affordable healthcare insurance is another key element to improve the health system. While building partnerships with civil society and other partners will help expand access to medical care, there is also a vital need to invest in district and community health systems to fulfil our vision for a health-creating society.

The success of several Public Private Partnership models in transforming health services across Africa proves beyond doubt that this model of collaboration is key to improving healthcare provision. However, for it to continue to foster development, we need to scale up capacity in the health work force by providing opportunities for professional development and skills enhancement. There is also an increased need to encourage the vital build-up of strategic health infrastructure to meet the increased demand for services.

The adoption of new technologies across the continent to improve efficiency is offering unprecedented opportunities for improving health. Digital solutions, for instance, can bolster healthcare access and services across Africa at a fraction of the cost.

As we rethink Africa's approach to health, we also need to align external funding to national priorities, programmes and systems. Finally, there is an urgent need to provide ample and affordable speciality care service to curb and reverse the current trend of medical tourism.

4. Could you highlight the main technologies to watch out for in Africa in the coming year/s?

In terms of technology, we have seen how mobile technologies and digital solutions can penetrate through the problems of geographical barriers and low resources. Digital health is therefore definitely changing healthcare delivery and access in Africa. The availability and penetration of Electronic Medical Records is also expected to increase in the coming years.

Gene therapy is also slowly emerging as a strategy to treat diseases caused by genetic abnormalities. Genome-editing technology has immense therapeutic potential in treating diseases by the repair of gene defects.

The growing incidence of non-communicable diseases will also require large-scale investments in diagnostic and imaging equipment for in-patient monitoring. In addition, provision of specialised care services will contribute to a stronger healthcare delivery system.

Africa is also gearing towards achieving affordable medical insurance to provide everyone with access to quality health services at a reasonable cost. Greater coverage will certainly transform healthcare in Africa.

5. With respect to the private healthcare sector, what are the main emerging trends in Uganda?

In Uganda, the role of the private sector is significant in achieving healthcare coverage. There is increased private sector involvement in the implementation of healthcare facilities, greater investment in pharmaceutical production and the supply chain, and on new technology and innovation.

The private sector is also involved in infrastructure and other support sectors like water and energy. The implementation of public-private partnership policies and provision of incentives for investments has further promoted the private sector.

6. In which areas do you see scope for partnerships with private investors? How can the government encourage the private sector to increase investment into the healthcare system in Africa?

The chief areas for partnerships include contracting in service delivery and supply chain, pharmaceutical production, IT systems, health insurance, and infrastructure development.

Governments can support the private sector by providing investment of incentives and subsidies, fostering Public Private Partnerships, inclusion of the private sector in policy and planning, stabilisation of the political and economic environment for business, and promoting foreign direct investment.

7. What would you like investors and visitors around the world to know about the health sector in Uganda? What are the real benefits and opportunities that an event like Africa Health can provide to healthcare and trade professionals?

The health sector in Uganda is ready for large capital investment. The Government of Uganda has provided a conducive environment for foreign direct investment in the form of subsidies and market incentives, as well as a stable political and macroeconomic environment. Market players enjoy economies of scale from the regional market and the market has huge potential of expansion.

An event like Africa Health will provide an opportunity to showcase real investment opportunities in Uganda to potential investors and help to attract foreign direct investment in the sector. The event will also offer opportunities for shared learning on promoting the role of the private sector in achieving health-related Sustainable Development Goals.

The health sector has been contributing more significantly to the economy through creation of new jobs, expansion of manufacturing, medical tourism, innovation and technology. The sector should therefore be seen as a profitable area of social enterprise and a foreign exchange earner to the region. **AH**



Hon. Sarah Opendi, State Minister for Health, Uganda

DIGITAL FUTURE OF HEALTHCARE

By Prof MN Chetty, Associate Prof Research, Durban University of Technology; Chairman, Independent Practitioners Association Foundation (IPAF); CEO, Kwa Zulu Natal Doctors Healthcare Coalition (KZNDHC)



“The healthcare industry is shifting to a patient-centred model that harnesses technology to both open communication channels and create a platform for patient engagement,” said Doris Savron, executive dean for the College of Health Professions at University of Phoenix, in a statement. “Given this shift, it is crucial that patients not only have access to these technologies, but also view them as important resources for improving their health and overall care experience.”

Digital revolution is in its early days but it is expected to have a profound effect on healthcare delivery.

By digital health is meant all “disruptive

technologies that democratise the access to data, information, devices and procedures in healthcare”. It also extends to “tearing down the Ivory Tower of medicine and empowering patients at the same time”.

A look at the sectors around us that have been affected by digital disruption escalates the need for healthcare to promote digital transformation as a strategic priority.

- Uber is upending the taxi industry
- Airbnb is threatening hotel revenues
- Netflix, Hulu and similar services have radically changed the TV industry dynamics.

McKinsey’s recent Digital Enablement Survey, shows that healthcare organisations are devoting an increasing proportion of

the IT budget to build digital capabilities rather than supporting core IT infrastructure (e.g. claims processing systems). This is expected to account for more than 50% of their strategic IT budgets within the next 3 to 5 years.

Digitisation can help payors and healthcare delivery. It will have a significant positive impact on payer economics, primarily through four levers.

Level 1: Stronger connectivity

This will enhance a greater consumer experience. It will also enable payors to engage more effectively with providers.

It will provide more sophisticated,

digitally enabled tools to manage population health and also provides a clearer method for gauging the quality of care delivery.

In addition, it will provide for better collaboration and data sharing with providers which will support more effective care coordination.

Lever 2: Greater efficiency and automation

Automation is defined as the use of control systems and information technology to reduce the need for human work. It also increases efficiency. As healthcare transitions to population health, automation goes from “nice to have” to a “must-have”.

As automation is not subject to human error or fatigue, they can provide consistent basis for care activities and improved quality. It also improves predictability of outcomes and provides for a higher throughput.

Efficiency is further aided by “data driven” insights.

Lever 3: Better decision-making

Digitisation allows for advanced analytics and big data insights and will make it possible to implement value-based reimbursement which, through advanced analytics, can be extended to population health. It will have a direct effect on the economy as a whole.

Lever 4: More advanced innovations

Digital support allows payors and governments to think more broadly about their business models and care delivery innovations.

New approaches to care delivery have the potential to hold down costs. These include wearables that monitor the health status of patients with chronic conditions, telemedicine, and “virtual visits” that reduce the need for in-person physician consultations. This, however, must be qualified to be extended to the doctor’s patients, and within the specified period of last face to face consultation. There will also be a need to qualify extent of treatment and medications prescribed.

Digitisation can also make healthcare more accessible by giving patients easy access to their medical history, and help them locate nearby clinicians, specialists and facilities.

By a combination of these four levers, payors can achieve a significant impact on the way healthcare is delivered and managed.

Financial Benefits of Digital Transformation

- The average savings are predicted to be about 10% to 15%, i.e. \$15bn to \$25bn.
- Over a long term, there is bound to be a significant decreased spending on medical services. Most of the savings will come from substitution of lower cost efficient services for more expensive alternatives.
- Most of the primary care services are likely to increase as would spending for those services. It is estimated that the increase in costs will be affected by lower utilisation of more expensive services.
- Consumers will be the primary beneficiaries of the lower spending, but some of the savings will accrue to the payors and providers.

To get the buy-in by healthcare professionals, one has to advance rational reasoning and incentives.

The present healthcare delivery is focused on cost savings far more than quality. Often corporate involvement assesses the benefits solely based on return on investment or impact on the bottom line of “balance sheets”.

The advancement of digitisation must benefit the patients. There must be quality outcomes, wellness enhancement and cost savings. To achieve this, one must factor in the cost of digitalisation to the providers of care and also extra skills and responsibilities on the providers. It will not work if the providers are not reimbursed appropriately against the savings realised. This has to be a transparent and responsible participation of all the stakeholders.

At present digitalisation is financially more beneficial to payors whilst providers are not incentivised adequately to participate in this digital transformation.

Digitisation and Chronic Healthcare

Digitisation has been described as a most innovative programme for the future of healthcare. By 2025 it is estimated that the spend on chronic healthcare will be as much as 67% of the total healthcare spend. This will impact the way patients receive healthcare and the manner in which providers are reimbursed.

The digital revolution will help to manage chronic care, allow for early diagnosis, avoid increase in co-morbidities, decrease hospitalisation, promote healthier

populations and manage the rising healthcare costs.

This is a major concern as we prepare for the future and navigate a challenging healthcare journey towards 2025. Many healthcare programmes are setting a target of total digitisation by 2020.

Digitisation is the Future of Healthcare

We need to embrace this debate and switch to a digitalised healthcare platform. There will be different channels available to stakeholders depending on how competent they are. But the change has to start now. Healthcare must embrace the digital revolution to stay relevant. Providers must embrace this change as the evidence is clear that competent digitalisation is the destination for the future of global healthcare.

To support the impact that this programme will have on healthcare, venture capital investment into digital health more than quadrupled between 2011 and 2015 (from \$1.1billion annually to \$4.5 billion).

We must not lose sight of the people driving the demand for this technology and their needs – the patients, citizens and communities for whom it will be put to work. **AH**

References available on request.



Prof Morgan Chetty is the Chair of the Healthcare Management Conference at the 2018 Africa Health Exhibition & Congress to be held at Johannesburg, South Africa.

USING TECHNOLOGY in the healthiest manner possible

By Dilip Naran, Head of Solutions at Med-e-Mass & MediSwitch

The benefits of technology can be found across industry sectors, and the healthcare market is no exception. The development of business management software and claims submission solutions is just the start of a process that is bringing healthcare providers and patients closer to one another.

As Head of Solutions at Med-e-Mass & MediSwitch, businesses that focus specifically on healthcare IT and e-commerce, I believe that the market for e-health services in Africa has been growing steadily for the past five years, with some parts of the continent having adopted SMS as a means to roll out public health initiatives early on.

The growth in such services is visible in both the private and public sectors, and is driven by the increase in broadband access and the concomitant decrease in price. The increasing availability of applications and smartphones is also playing a part in driving further e-health growth.

This, in turn, leads to increasing benefits to both patients and healthcare organisations. For the providers, technology enables effective e-records, including patient information, lab results and care plans for patients with chronic conditions. This means that a doctor checking such records is made fully aware of previous and current ailments and treatments.

As far as individuals go, patient-based applications allow people to become more involved in looking after their personal health. Access to relevant information empowers patients to take ownership of their conditions, such as in diabetes cases, where patients can now monitor blood glucose levels, weight and calorie intake.

There is also a move towards social media, with individuals engaging with other patients who have the same conditions.

Ultimately, technology is helping to close the loop between the patient, the healthcare provider and the medical aid funder. This is being driven by increasing volumes of data, coupled to advanced analytic techniques. Healthcare professionals can now extrapolate more knowledge from this information, thereby making better decisions, managing costs more effectively and being able to treat patients earlier and more effectively – thus reducing the number of expensive hospitalisations.

The biggest challenge facing large-scale implementation of e-health services, however, lies in interoperability. Different players in the field have different systems, and these do not always talk to one another.

Fortunately, the South African National Department of Health has set up the Health Normative Standards Framework (HNSF) in conjunction with the Council for Scientific and Industrial Research (CSIR), which lays out the ground rules for interoperability and should help to integrate health enterprise standards.

With these clearly defined rules, we will be in a position where any application related to e-health in South Africa will need to be compliant with the HNSF. Once true interoperability is achieved, an increasing number of disparate e-health systems will be able to securely share healthcare information more effectively.

As for Med-e-Mass & MediSwitch, our companies have recognised e-health as a huge growth area and as such, has made significant investments in respect of both applications and resources. We

expect to see a huge upward trajectory in terms of the usage of e-health systems, encompassing applications, security and analytics, to name a few. Each of these areas offers opportunities and our company is putting a lot of effort and resources into developing solutions for the future.

This is a really exciting time for e-health care in South Africa and across the continent. We believe we will have a key role to play in this space as things move forward. ^{AH}

Dilip Naran is a Speaker at the Healthcare Management Conference at the 2018 Africa Health Exhibition & Congress to be held at Johannesburg, South Africa.



With over 15 years' experience in healthcare in South Africa, Dilip Naran's expertise lies in Electronic Patient Records (EPR, EMR, EHR) and billing systems and, in particular, large scale implementation of such solutions.



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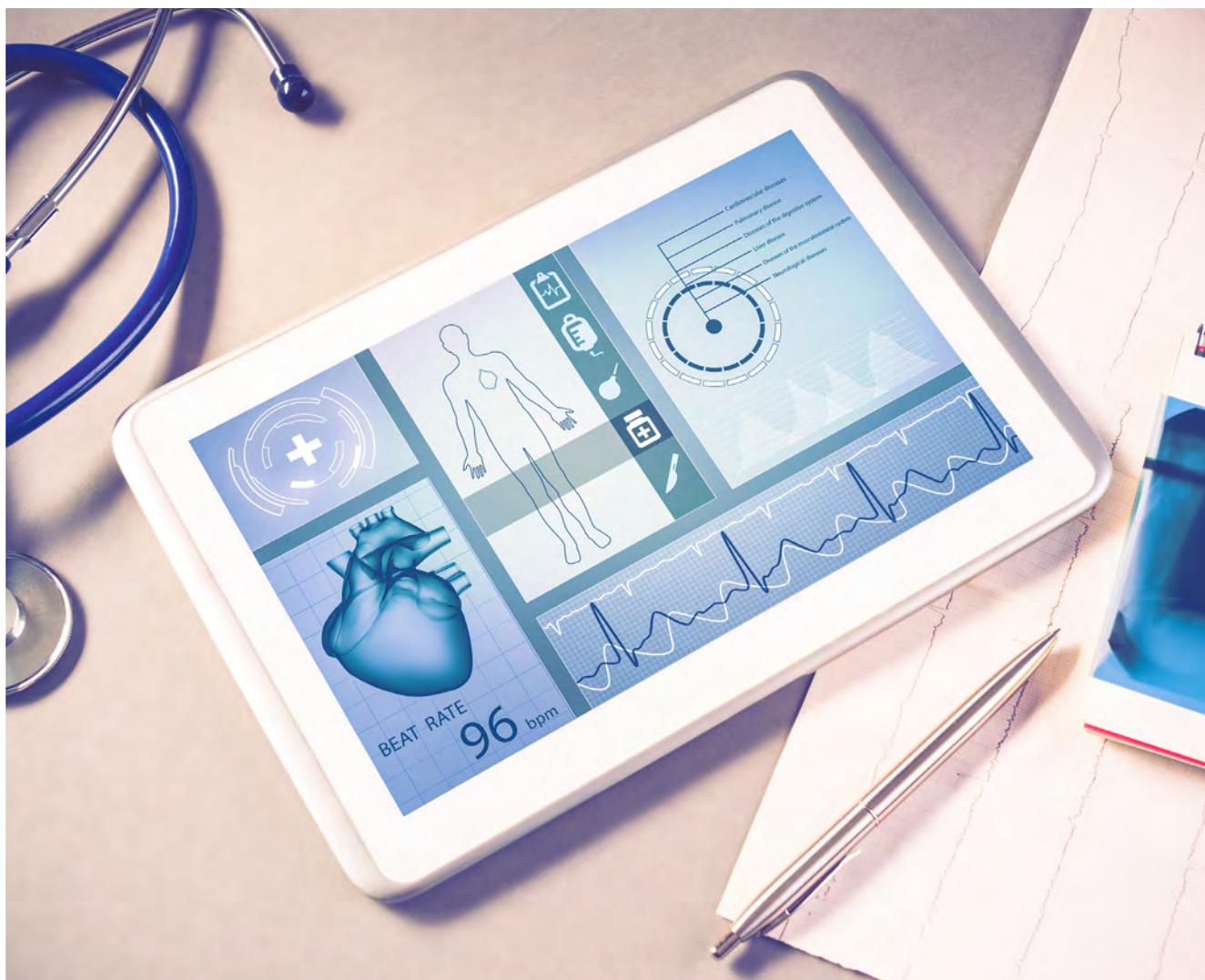
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Accelerating and Scaling Digital Health in LMICs:

GOVERNMENT LEADERSHIP IS KEY

By Florence Gaudry-Perkins, Founder & CEO, Digital Health Partnerships



In lower- and middle-income countries (LMICs), access to health remains an important issue to solve. Shortage of healthworkers is one challenge among others: according to the World Bank, there is only 1.2 doctor in LMICs (versus 2.9 in high income countries) and 2.1 nurses or

midwives per 1,000 people (versus 8.7 in high income countries). At the same time, 90% of smartphones users will be located in LMICs in 2020. The promise of digital health to address some of the underlying health systems challenges is undeniable. Digital health can significantly support the

achievement of Universal Health Coverage (UHC), one of the targets of the third Sustainable Development Goal (SDG). A recent report estimated for example that 1.6 billion people could benefit from quality medical services through digital health solutions. Beyond access, digital health can

also play an important role in terms of cost reduction and health systems efficiency and quality. Although not many countries have yet analysed the impact of digital health on their systems, it is notable that Canada estimated that their investments in digital health (implementation of electronic medical records (EMR), telehealth and district information systems) generated savings of CAN\$16 billion since 2007.

Many challenges remain to fully leverage the tool of digital health. Fragmentation, data interoperability and lack of appropriate legislation and laws are still prevalent. The Ebola crisis was one of the wake-up calls to the growing realisation that data fragmentation needs to be addressed if ICT tools are to be used for effective data collection and analytics. Data needs to be integrated to make it useful in real-time to healthcare professionals or public health authorities.

A striking example of what we mean by fragmentation is Mali where there are 11 different mobile health initiatives for maternal and child health funded by different institutions. Moreover, most of these institutions use their own tools and systems which are not interoperable with systems used by the national eHealth agency. In LMICs, the number of digital health projects had increased by more than 30% between 2005 and 2011 but two thirds were still in pilot or informal stages. Although this statistic is a bit dated, "pilotitis" has been a common word used in the field of digital health for many years and is still prevalent.

Many countries still do not have the appropriate data security and data privacy regulations in place and this is a current hot topic that hinders the trust of any user. A lack of proper legislation to govern mHealth Apps or connected devices and sensors can also undermine investments in countries.

Beyond these obstacles, other barriers still need to be tackled: insufficient human and technical capacity to analyse health data and meet patients' needs, resistance to technology, unsustainable financing, lack of coordination between national ICT plans and national digital health strategies, connectivity gaps, quality and performance issues of networks, and lack of reimbursement schemes.

As the cycle of digital health evolves,

there is a growing realisation on the fundamental role governments have to play in advancing the use of technology for health by developing the right policies and infrastructure as well as building capacity for digital health. In February 2017, the Broadband Commission Digital Health Working Group (co-chaired by Novartis Foundation and Nokia) published a report called: "Digital Health: A Call for Government Leadership and Cooperation between ICT and Health". It advocates for governments to take action on national digital health strategies to solve the fragmentation dilemma and help tackle the challenges mentioned above.

As of 2016, 58% of WHO's member states had developed national digital health strategies. This does not translate in the fact that countries have implemented these and there is therefore still a lot of work ahead. Implementing a strategy is no minor task and represents a significant investment: the Government of Rwanda committed US\$32 million for its first 5-year eHealth plan for example. Tanzania's more recent digital health road map calls for overall investment of approximately \$74 million. The above-mentioned report looked into 8 countries that managed to advance effectively the digital health agenda (Canada, Estonia, Malaysia, Mali, Nigeria, Norway, the Philippines and Rwanda) and provides key insights and lessons which other countries can leverage from.

A key finding was that countries achieving success in implementing strategies shared responsibility and investment between the Health and the ICT authorities (typically between Ministry of Health, Ministry of Communication and the eGovernment agency).

Perhaps the most important learning from the global scan that was done, is the utmost importance of having the appropriate leadership and governance in place to enable the effective implementation of a national digital health strategy. Many stakeholders saw this as the most challenging first brick to attain in order to robustly build around the other essential components of a strategy: Strategy & Investment, Standards and Interoperability, Infrastructure, Legislation & Policy & Workforce. Government leadership is vital in fostering an enabling environment for digital health policies and an effective cross-

sectorial governance mechanism, the basis for facilitating alignment and cooperation between health and ICT sectors.

In terms of governance and government leadership, some LMICs are true models. In the Philippines, close cooperation between health and ICT ministries has been materialised in a joint MoU and governance mechanisms with clear role and responsibilities strong high-level commitment of broadband s, and Rwanda's very policies and extraordinary intersectoral governance makes it a real example for many countries around the world. It embodies the promise for these countries to leapfrog and avoid the difficulties today faced by high-income countries, often linked to legacy infrastructure and systems.

The digital health eco-system in LMICs is entering a new phase where the focus is starting to shift to investing in "the roads" for digital applications and services to scale. In other words, a shift to a "system" thinking vs. solutions. This evolution will accelerate the scaling and development of digital health and help in achieving Universal Health Coverage. **AH**

References available on request.

Florence Gaudry-Perkins is a Speaker at the Healthcare Management Conference at 2018 Africa Health Exhibition & Congress to be held at Johannesburg, South Africa.



Florence Gaudry-Perkins is the founder and CEO of Digital Health Partnerships (DHP), an organisation focused on scaling digital health in developing and emerging countries by creating multi-stakeholder partnerships

The management of potential tetanus exposure in the **EMERGENCY DEPARTMENT**

By Dr Lara Goldstein, MBBCh, MMED (Emergency Medicine), FCEM (SA), Cert. Critical Care (SA)

The spore of *Clostridium tetani* is pervasive in the environment and leads to tetanus - an illness characterised by the acute onset of painful muscle spasm seemingly without cause. The global mortality rate of tetanus is estimated to be 30-50% but no one who has completed a primary immunisation series has ever died. The vaccine for tetanus is nearly 100% effective. Tetanus is a notifiable disease.

Clostridium tetani spores may be found in soil, manure, dust, skin, clothing and in the gastrointestinal tract in 10-25% of people. The spores release 2 toxins when they germinate viz. tetanospasmin (major toxin which enters the nervous system) and tetanolysin (non-toxic but causes damage to tissues).

Symptoms usually occur one week post-infection but can occur between 3 days and 3 weeks after exposure.

There are 4 forms of tetanus: generalised, local, cephalic and neonatal.

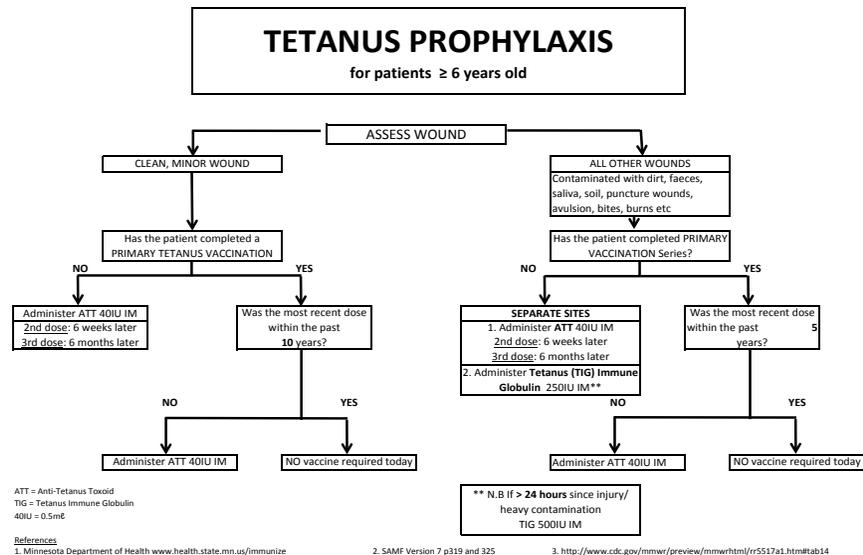
Generalised tetanus is the most common form featuring *risus sardonicus* and *trismus*. There may be involvement of the laryngeal muscles and the diaphragm which may compromise airway protection and ventilation. Subsequent autonomic instability is also a cause of mortality.

Local tetanus just causes muscle rigidity at the site of the wound inoculation. It may persist for months but usually resolves without negative sequelae. It may precede the generalised form.

Cephalic tetanus is a form of local tetanus due to a head wound. It can lead to cranial nerve palsies and be confused with a Bell's palsy.

Neonatal tetanus occurs due to umbilical cord stump infection in neonates whose mothers were not previously immunised. Application of traditional poultices including cow dung also play a role in infection. Death occurs in up to 50% of tetanus cases in neonates in developing countries.

Tetanus is a clinical diagnosis. There is no benefit to laboratory or radiological tests unless an alternate diagnosis is considered more likely.



Pre-exposure prophylaxis

Pre-exposure prophylaxis should be administered according to local immunisation schedule guidelines.

Post-exposure Prophylaxis

Refer to the attached flow chart for guidance regarding tetanus vaccination and immunoglobulin administration.

Treatment

Prevention of further toxin release: Antibiotics kill the bacteria and therefore prevent further toxin release. Metronidazole should be used and *not* Penicillin G (increased risk of seizures due to inhibition of GABA and further potentiation of tetanospasmin). Metronidazole has comparable or better antimicrobial activity than Penicillin G. Tetanus toxoid immunisation should also be given as neither the disease nor the immunoglobulin conveys long-term immunity.

Surgical debridement has no benefit for tetanus. The wound responsible is commonly healed/healing at presentation. If debridement is indicated, it should be undertaken after the patient has been stabilised.

Neutralisation of unbound toxin: Tetanus immunoglobulin must be given within 24 hours of exposure in order to neutralise unbound toxin. Dosage is toxin-based not weight-based - 250-500IU IM is considered

appropriate for both adults and children.

Minimisation of effects of bound toxin:

Benzodiazepines (preferably short-acting e.g. midazolam) can be used for both spasms and seizures. Magnesium sulphate, 40 mg/kg followed by a continuous intravenous infusion can be considered as an adjunct but is still under investigation. Patients may need sedation, intubation and paralysis in ICU (need to monitor for seizures with an EEG if patient is paralysed).

Dr Lara N Goldstein is a Speaker at the Emergency Medicine Conference at the 2018 Africa Health Exhibition & Congress to be held at Johannesburg, South Africa.



Dr Lara N Goldstein is a Specialist Emergency Physician and Intensivist at Netcare Mulbarton Hospital ICU, Division of Emergency Medicine, University of the Witwatersrand Johannesburg, South Africa

Medical malpractice litigation: Undermining South Africa's health system

According to South African Health Minister Dr Aaron Motsoaledi, there has been an 'explosion' of medical malpractice litigation claims in the country over the past few years in both the public and private health sectors, as compassion-based practice of medicine is slowly giving way to defensive medicine and mistrust.

In 2017, it was reported that Gauteng Health Department alone had paid out at least R1 billion in lawsuits since January 2015 while the Eastern Cape is facing pay outs of R14 billion.

The Medical Protection Society SA (MPS), in 2015 settled a claim of almost R24 million on behalf of a member and has reported a 35% increase in the number of claims made against healthcare professionals between 2011 and 2016, with larger claims, in particular, on the rise. MPS further reports that claims over R1 million have increased nearly 550% compared to those of 10 years ago and claims of more than R5 million increased by 900% from 2008 to 2013.

What, therefore, are the reasons for the rise in medical claims? According to Justin Malherbe, Senior Associate at international law firm Norton Rose Fulbright, one among the several reasons include an increase in public awareness of patient rights coupled with incessant and deliberate marketing by personal injury lawyers eager to capitalise on this awareness.

"Amendments to South African legislation, such as the Road Accident Fund (RAF) legislation is also to blame," he adds, explaining that with damages claims during motor vehicle accidents becoming less profitable for lawyers, they are turning to other forms of personal injury litigation like medical malpractice.

Professor Sylvester Chima, Associate Professor and Head at the Programme of Bio and Research Ethics and Medical Law at the University of KwaZulu-Natal, believes that the high levels of lawsuits in South Africa are in part due to the legal framework which both governs and protects patients and healthcare providers.

"A good example of this is the law around Termination of Pregnancy (TOP) which provides for termination up to 40 weeks of pregnancy for severe congenital abnormalities. This means that if a doctor fails to diagnose a severe abnormality, the parents may sue the doctor for maintenance costs for the child," says Prof Chima, who will be presenting his findings at the 2018 Africa Health Congress.

Another example is the law which obligates health professionals to obtain signed consent from patients before providing their services, but which many doctors do not adhere to, leaving them vulnerable to malpractice claims.

In South Africa, it is not only the number of claims which continue to rise but also the size of the claims and pay outs. Malherbe explains that the costs of 'catastrophic claims', such as those for birth defects and brain injuries, have risen drastically as the cost of caring for patients has increased due to technological advancements which improve life expectancy and quality of life.

Both experts agree, however, that progressive interventions need to be found to stem the litigation tide.

Professor Chima suggests that the

current system relies on 'righting a wrong' through the courts, which by its nature is expensive and adversarial. "A compensation fund, similar to the UK's Clinical Negligence Scheme Trust, where cases are mediated and settled would save on expensive legal fees but still compensate those who have been affected by medical negligence," he says.

Malherbe comments that stakeholders in both the private and public health sectors are committed to changing the claims situation by implementing better risk management strategies and renewed interventions, such as defined standards of care; managing patient expectations versus outcomes and improving patient experience through timeous communication and education.

"The shared hope of all stakeholders is that the current effects of the rise in medical malpractice claims can be off-set by timeous intervention and a co-ordinated approach to preserve the stability and ensure the sustainability of healthcare in the future," concludes Malherbe. ^{AH}

Both Professor Chima and Justin Malherbe will be speaking at the Ethics, Human Rights & Medical Law Conference at the 2018 Africa Health Exhibition & Congress 2018 to be held at Johannesburg, South Africa.





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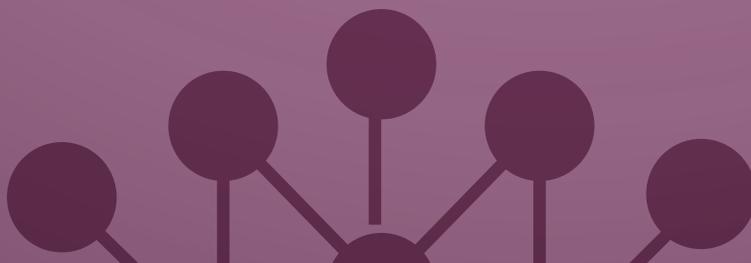
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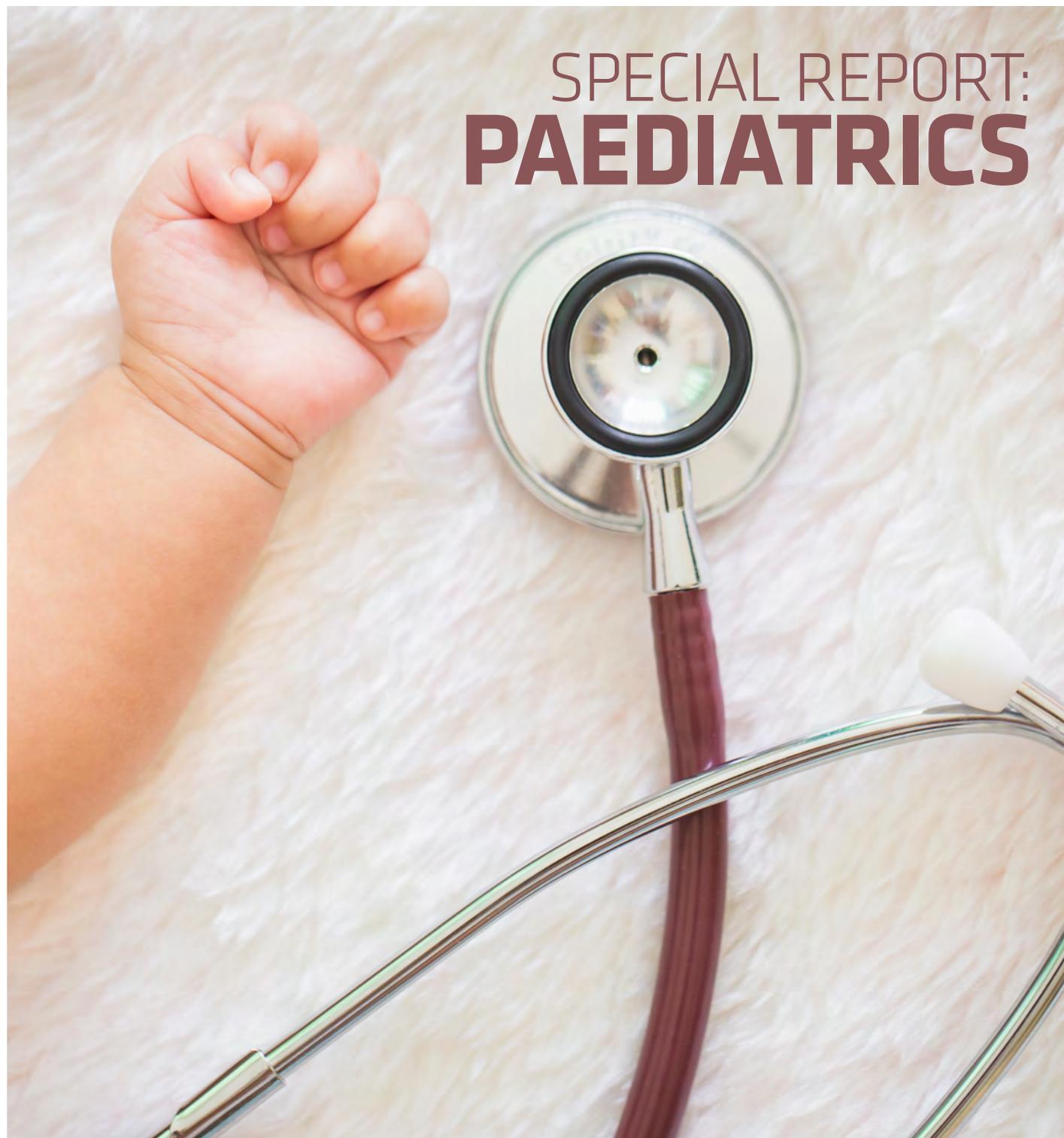
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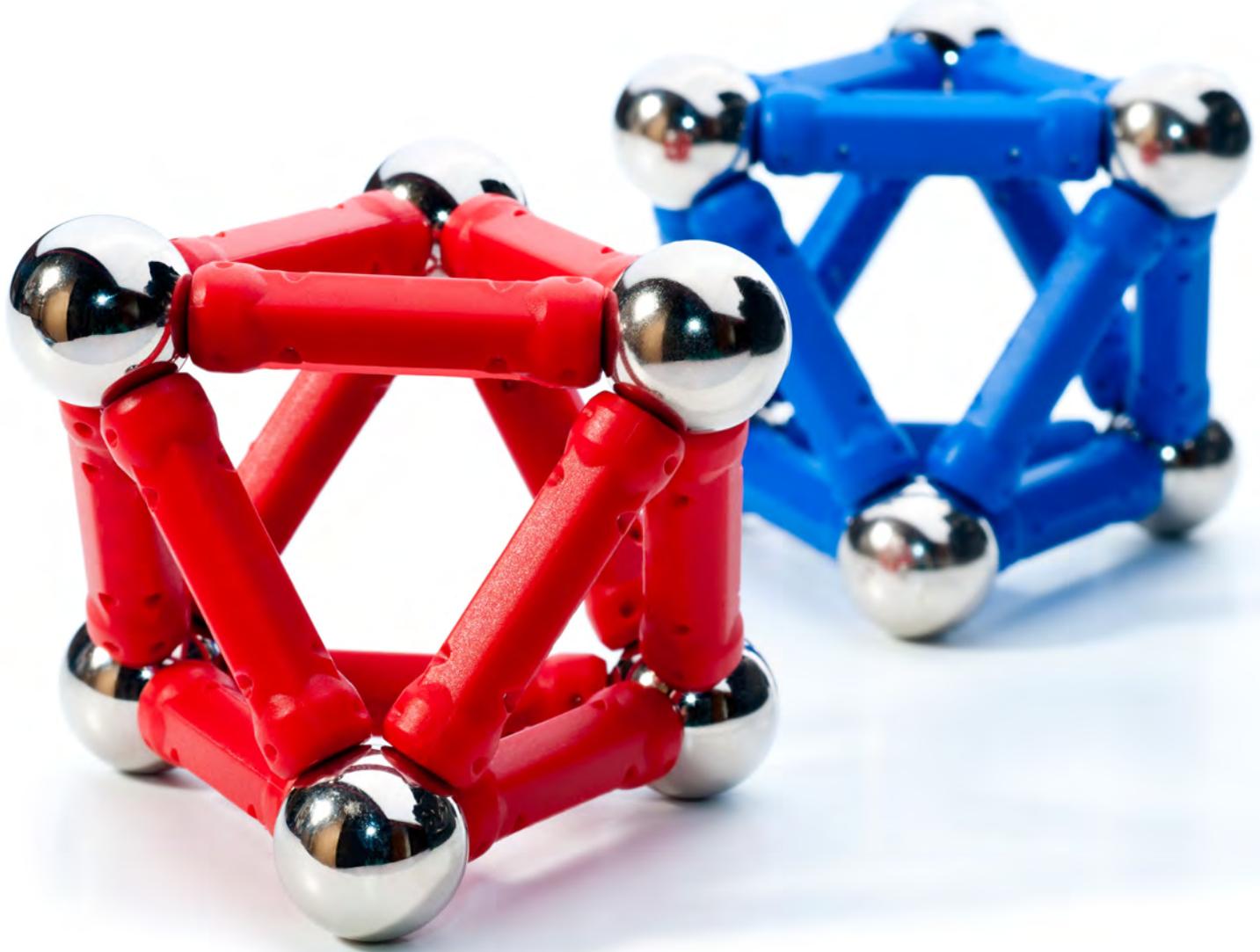
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PAEDIATRIC MAGNET INGESTION: RISKS, MANAGEMENT, AND COMPLICATIONS

Ingestion of magnetic toys poses a significant health risk in children and could be life-threatening. Urgent preventive measures are needed to reduce risk of serious complications

By Dr Hussein Naji, MD, FACS, FRCS (Glasg), FEBPS, Consultant Paediatric Surgeon, American Hospital Dubai

Children are naturally curious and are willing to explore their surroundings. They may unintentionally ingest objects or substances within reach, found most commonly in the household. The ingested foreign bodies are typically small objects such as coins, fish bones, marbles, and drugs. In particular, the accidental ingestion of magnetic foreign bodies in paediatric

patients has become common due to the increasing use of toys with magnetic elements. These magnetic toys (henceforth referred to as multiple magnets) possess significant injury risk when more than one is swallowed. It is our job as healthcare providers to prevent and manage these ingestions. This article reviews the risks, management, and complications of multiple magnet ingestions in children.

What are multiple magnets?

The rare-earth metal magnets composed of neodymium, iron, and boron are 5 to 10 times stronger than the typical refrigerator magnets made of ferrite and have been increasingly used in toys and marketed as adult desk toys with different names like neomagnet, neodymium magnet, buckyballs, etc.

These sets typically consist of 20 to 216 small, powerful, spherical magnets that can

be linked together to create a wide variety of shapes and patterns. Despite being marketed to adults and may bear clear warning labels on the package, these novelty toys often fall into the hands of children.

If ingested, a single magnet is typically passed unnoticed; however, if multiple magnets are swallowed together or with another metallic object, sequelae are significant and can be life-threatening. These magnets pose a unique hazard owing to their ability to forcefully attract one another across loops of bowel, leading to pressure necrosis of the intervening bowel wall, hollow viscus perforation, intestinal fistula, sepsis and potentially death.

Current Situation

In the first quarter of 2018, three children were admitted to the American Hospital Dubai due to ingestion of multiple magnets. In two of these cases, the ingestion was witnessed by the parents while the third one presented features of acute intestinal obstruction and a radiologic examination showed the presence of multiple magnets as a causative agent for the intestinal obstruction (Figure 1). Emergency operations were needed for 2 of them to remove the magnets and manage the multiple bowel perforations and fistula formations (Figure 2). One of the children was observed strictly with radiologic examination monitoring till the magnets passed out spontaneously.

At our Hospital, once the multiple magnetic materials are identified, the practice has been to remove them by endoscopy while they are still in the stomach to avoid serious sequelae. If the magnets pass through the stomach, then we try strict conservative management with serial imaging daily for a few days. If this fails, as lack of migration of the foreign bodies, serial images show a gap between magnets, or the patient deteriorates clinically, then emergency surgery (explorative laparoscopy or laparotomy) is promptly indicated. Sometimes the strict follow-up is successful, and the magnets found attached to each other all the way according to abdominal radiographs have come out with defecation after 2-4 days. Similar guidelines were published by the author in 2012.

Legislation and recalls

My previous experience with magnet ingestion was reported in 2012 and a campaign was undertaken to remove such magnetic toys from the market. Large institutions and centres

published many reports from different countries and as a consequence, various consumer safety and government organisations across the globe began using regulatory powers to restrict or curtail the availability of these products.

Most developed nations have regulatory authorities tasked with ensuring consumer safety and protection. For example; in the US, this responsibility is granted to the Consumer Product Safety Commission (CPSC), and in Canada, Health Canada serves that role. These agencies must identify new hazards, quantify relative levels of harm, and use their legislated powers to promote public safety. The consumer protection agencies have various options at their disposal to enforce policy. Among these, a product recall is the strongest, and as such is typically reserved for cases where other approaches are deemed insufficient.

In 2014, the CPSC issued a strong federal safety standard for high-powered magnets. Under the Consumer Product Safety Act, this performance standard stipulates that any magnet manufactured or imported on or after April 1, 2015, must be large enough to decrease its ingestion hazard or the magnetic force must be lowered.

In Canada, a mandatory product recall was established in 2013 and resulted in a significant reduction in the morbidity associated with ingestion of multiple magnets which was demonstrated clearly in a recent study that was published in 2017.

Prevention

In the UAE, there has been a significant rise in the incidence of multiple magnet ingestion among children that was noticed in the last couple of years (from our experience and from the direct contact with other paediatric surgeons in the UAE). This is mainly due to the availability of these magnetic toys in the market and online shops.

We think that healthcare givers should continue to counsel patients on magnet safety, discuss safe and age-appropriate toys, and warn about the serious health hazards associated with magnet ingestion. Adolescents should be discouraged from use of magnets which may lead to unintentional ingestion. In the event of ingestion, parents and patients must seek immediate medical attention, as delay in management may increase the risk of complications.

We need to clearly highlight these potential risks and ask the appropriate

regulatory authorities to take an action to remove these magnetic toys from the market in order to safeguard our children from threat of multiple magnet ingestions.

Conclusions

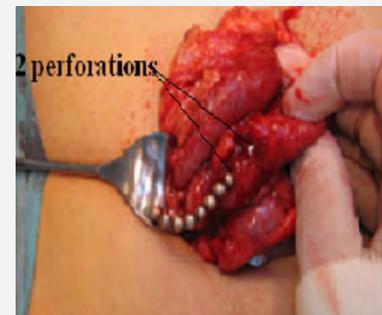
Despite their attraction, high-powered magnets are an avoidable source of potentially life-threatening injury. Parents and caregivers should remove them from the reach of children, and medical providers should maintain a high index of suspicion of their ingestion. Consumer protection agencies need to enforce certain policies to reduce the alarming rise in multiple magnet ingestion among children in the UAE. ^{AH}

References available on request.

FIGURE 1: Abdominal radiographs showing 14 ingested magnets



FIGURE 2: Showing 2 perforations in the bowel



In addition to general paediatric surgery, Dr Hussein Naji has a strong background and experience in neonatal surgery and laparoscopic paediatric surgery

Novel immunotherapy research study targets aggressive **PEDIATRIC CANCERS**

Article provided by Cincinnati Children's Hospital Medical Center

Immunotherapy research is a rapidly expanding field of study in the adult cancer world, but progress has been far slower in pediatrics. A new study at Cincinnati Children's Hospital Medical Center in the United States seeks to change that, by testing a novel combination of immunotherapy, low-dose chemotherapy and hypofractionated radiation therapy in the treatment of aggressive childhood cancers.

Triggering an immune response

"Pediatric immunology anticancer research presents significant hurdles, in part because of the nature of childhood cancers," says co-lead investigator Brian Turpin, DO, a cancer specialist at Cincinnati Children's. "In adults, tumors frequently bear antigens that the immune system recognizes and can attack. However, pediatric tumors often do not express these immunogenic targets, due to the low mutation burden and other factors unique to these tumors. So the tumors often escape immune surveillance or immune-mediated destruction."

To overcome this resistance to immunotherapy, the trial uses two immune adjuvants. One is the chemotherapy drug decitabine, a methylation inhibitor that induces the tumor cells to express antigens—essentially "targets" for the immune system. The other is hypofractionated radiotherapy (larger doses given in just a few treatments). This has been shown in preclinical studies to stimulate the innate immune system and modify the tumor microenvironment in a way that teaches the immune system to react against antigens released from the dying cancer cells. Patients may receive proton or photon radiation therapy as part of the study.

To stimulate the immune system and unleash its potential to destroy tumors, the study uses the immunotherapy anticancer drug pembrolizumab. This checkpoint inhibitor "unleashes" immune cells, enhancing their ability to destroy tumors. There are more



than 700 clinical trials worldwide involving pembrolizumab, but only a few are for the pediatric population. This is the first pediatric study to use pembrolizumab in combination with other immunotherapy agents.

Novel strategies

Co-principal investigator Ralph Vatner, MD, PhD, cites a few additional "firsts" for the study. "This is the first pediatric research study to use medical immunotherapy and immunogenic doses of radiotherapy to stimulate the immune system as a treatment for metastatic and recurrent tumors," explains Vatner, a radiation oncologist at the University of Cincinnati Medical Center. "It is also the first clinical trial incorporating proton therapy in some patients for stimulating the immune system, and the first trial combining proton therapy with checkpoint inhibitor immunotherapy."

Proton therapy is available at Cincinnati Children's, one of only two such centers in the world owned by a children's hospital. In the hands of the experienced cancer team at Cincinnati Children's, this specialized pencil beam scanning destroys cancer cells while

minimizing damage to surrounding healthy tissues and organs. "This study will help us understand how radiotherapy modifies the anti-tumor immune response in pediatric and adult patients, and will give some insight into the differences between proton and photon radiotherapy with respect to anti-tumor immune effects," says Vatner.

An exciting, new direction

The study is open to patients between 12 months and 40 years of age who have been diagnosed with relapsed, refractory or progressive lymphomas or solid tumors associated with childhood cancers (excluding primary central nervous system tumors). "The opportunity to use novel immune adjuvants is a major step in exploring what could be an important group of therapies for the most aggressive forms of pediatric cancer," Turpin explains. "We anticipate that this study may serve as a platform for other research that provides insight about key resistance mechanisms and ways to overcome them." ^{AH}

For further information, please email: Brian.Turpin@cchmc.org or Ralph.Vatner@cchmc.org



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A promise to children and families around the world

Article provided by Nemours Alfred I. duPont Hospital for Children

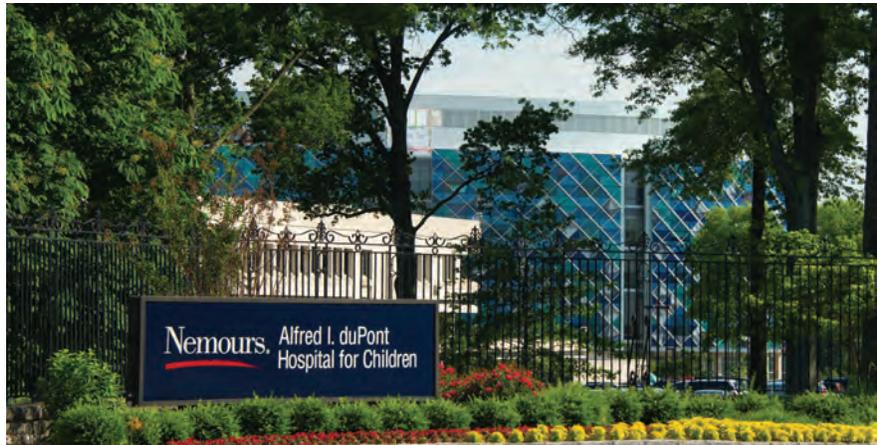
Children deserve the best care possible, no matter where they live. That's why doctors and families around the world turn to Nemours Alfred I. duPont Hospital for Children. As an internationally recognized children's health organization—and renowned for its pediatric orthopedic expertise—it provides highly specialized care with respect for each family's unique health, cultural and financial needs.

Nemours/Alfred I. duPont Hospital for Children is consistently rated among the best children's hospitals in the nation by U.S. News & World Report. And while this level of pediatric care is not always available around the globe, it is the Nemours promise to help every child, everywhere, have a healthier future.

What began in 1940 as a pediatric orthopedic institute is now a world-renowned full-service children's hospital, designed by families for families. The thoughts and ideas of children, parents and caregivers helped inspire the design of its space—an environment to promote children's physical, emotional and spiritual healing. Nemours has created a children's hospital like no other in the region, giving its patients and families the promise of even better days to come.

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- Delaware's only Level I Pediatric Trauma Center
- Intensive and acute pediatric care in a family-centered, kid-friendly environment
- Research that helps advance breakthroughs and cures
- Convenient service in your community through our care network, Nemours duPont Pediatrics



Highlights of the newly expanded hospital:

- Spacious single-patient rooms—all with a view to the outside, two TVs (one for the patient, one for the family), bathrooms with a shower, and pullout beds for parents to stay in the room with their child
- Rooms that accommodate special needs families
- Playroom, family solarium, lactation room (for nursing mothers), and washer and dryer on every unit
- Discovery Zone Presented by DuPont, an Xbox-powered digital wall that kids

can interact with and forget, for a few minutes, that they are ill

- Technologically advanced 44-bed Emergency Department and AstraZeneca Treatment Area with 44 bays

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Advanced health informatics system improves patient care at Children's Cancer Hospital Egypt

The Hospital achieves high level of healthcare IT adoption; becomes first healthcare facility in Africa to reach HIMSS 6

Children's Cancer Hospital Egypt (Hospital 57357) has become the first and only integrated digital hospital in all of Africa to achieve Stage 6 on the Electronic Medical Record Adoption ModelSM (EMRAM) by the Healthcare Information and Management Systems Society (HIMSS) Analytics. The accomplishment is an international benchmark for the use of advanced IT to improve patient care.

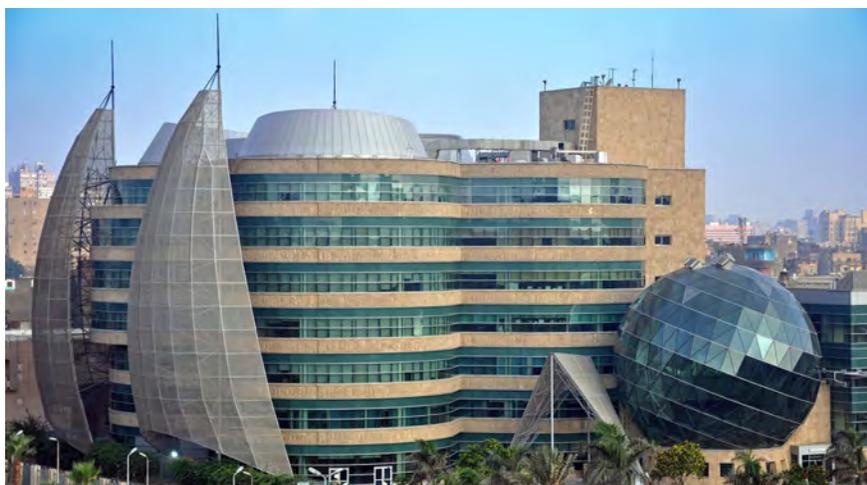
"Hospital 57357 shares Cerner's belief that a solid health IT infrastructure is the foundation for improving the health and care of patients through standardisation and automation of processes, and interactive clinical decision support for care providers. Being the first healthcare facility in Africa to achieve Stage 6 is not only an honor, but also a reflection of the hard work and dedication of our staff," said Dr Sherif Abouelnaga, CEO of Hospital 57357.

Nine years ago, Hospital 57357 launched the *Cerner Millennium*® integrated clinical information system, which enabled authorised users to capture, retrieve and share patient data seamlessly.

"*Cerner Millennium* supported our goal of providing integrated, high-quality healthcare services to our patients. The rich data we are collecting at every step in the care journey is the foundation for our research activities to improve cure rates," said Dr Mohamed Aggag, chief medical officer of Hospital 57357.

The hospital's healthcare information system enables the use of barcoded medication administration, which helps verify that the right dose of the right medication is given to the right patient at the right time. This is critical for patient safety and an essential requirement for HIMSS Stage 6 accreditation. Another prerequisite for the HIMSS recognition is the Computerized Physician Order Entry, which improves the accuracy and timeliness of tests, procedures and medication orders.

"When we implemented *Cerner*



Millennium back in 2008, we called it *MISK*®, which stands for Medical Informatics Saving Kids. This reflects our belief in the importance of the healthcare information technology throughout the patient's care journey," said Ayman Ibrahim, vice president of technology of Hospital 57357.

HIMSS is a global, not-for-profit organisation that recognises hospitals who have improved their delivery of healthcare through the use of information technology and electronic management systems. HIMSS Analytics developed EMRAM as a methodology for evaluating the progress and impact of electronic medical record systems for hospitals in the HIMSS Analytics Database. There are eight stages (0-7) that measure a hospital's implementation and utilisation of information technology applications. Hospitals can track and review their progress in completing each stage as they proceed toward Stage 7, which represents an advanced electronic patient record environment that delivers safety and efficiency improvements.

The Children's Cancer Hospital Egypt 57357 (CCHE), widely known as Hospital 57357, is a unique healthcare example which has been completely built by donations.

Inspired by the model of the St Jude Research Hospital in Memphis, Tennessee in the US, the Children's Cancer Hospital Egypt is the largest paediatric oncology hospital in the world in terms of capacity (320 beds). It was established in 2007 with the mission of providing the best comprehensive family-centred quality care and a chance for cure to all children with cancer seeking its services, free of charge and without discrimination.

Since its inception, CCHE administrators and top management realised that carrying out research in medical and non-medical areas of Hospital operations was a prerequisite to progress in achieving cure and a better future for children with cancer. This led the Hospital to adopt the most advanced health informatics system by Cerner which enabled the complete digitalisation of Hospital operations, its acquisition of a strong data base, and its transformation into a paperless Hospital. Not only is this project attempting to increase the childhood cancer survival rate in Egypt from less than an estimated 40% to the Western rates of 75-80% overall survival, it is also attempting to create a new system of healthcare where management and treatment utilise the most scientific approaches practiced today.



Giving new hope to children with metabolic disease

Children's Hospital of Pittsburgh of UPMC is a leading international center for liver transplantation as a treatment for metabolic disease.

As one of the top ten pediatric hospitals in the United States, as ranked by *U.S. News & World Report*, Children's Hospital of Pittsburgh of UPMC is a pioneer in the field of liver transplantation, which has proven to be a life-changing solution for patients with metabolic disease.

Liver transplantation can dramatically reduce symptoms, and in cases like maple syrup urine disease (MSUD), can provide a cure.

Liver transplantation is more than a lifesaving procedure; it's also an attractive approach for improving quality of life for many patients with metabolic disease. In 2004, we developed the protocol for liver transplantation for MSUD. Today, we've performed more transplants on patients with MSUD than any other center in the world. That's more than 65 patients with a 100-percent survival rate. All of these patients show normal liver function, have avoided the risk of neurological complications, and enjoy an unrestricted diet.

We've performed more liver transplants for patients with metabolic disease than any other transplant center.

Since the inception of our program in 1981, our world-renowned experts have performed more than 1,700 liver transplants — that's more than any other center in the United States — with survival rates that exceed national averages. Additionally, we've performed more than 320 liver transplants for patients with metabolic disease, which is more than any other center, including adult facilities. Also, we're leaders in living-donor liver transplants, which eliminate wait times for a deceased donor and can provide excellent outcomes.

Find out more about our excellent outcomes and extraordinary care.

Our experience, expertise, and commitment to innovation and compassionate care are reasons why patients and families from around the world travel to Children's Hospital of Pittsburgh of UPMC. For a free phone consultation with one of our experts on liver transplantation as a therapeutic option for metabolic disease, please visit www.chp.edu/metabolic or send an email to international@chp.edu

Sources: Internal data, Hillman Center for Pediatric Transplantation; Scientific Registry of Transplant Recipients (www.srtr.org), December 2015 release.



An Upstart on the Global Stage.

A CONSISTENT LEADER IN THE U.S.

Article provided by Nationwide Children's Hospital



With more than 1.4 million patient visits per year, Nationwide Children's Hospital has become America's largest children's hospital.

Recognized among the 10 best children's hospitals in the United States, Nationwide Children's Hospital is gaining prominence as a global destination for pediatric healthcare, providing care for hundreds of international families each year.

Founded back in 1892, the Columbus, Ohio, hospital has undergone substantial growth. Today, with more than 1.4 million patient visits per year, 1,316 medical staff and 11,200 employees, it has become America's largest children's hospital. This revolutionary growth stems from deliberate efforts to build top-quality programs with the world's greatest specialists in diverse practice areas.

A Global Destination for Complex and Rare Conditions

A regular on the Honor Roll for *U.S. News & World Report*, Nationwide Children's Hospital ranks among the best children's hospitals for all 10 evaluated specialties. The hospital ranks sixth among U.S. children's hospitals in National Institutes of Health (NIH) research funding and is accredited by the Joint Commission. Nationwide Children's Hospital also is among only two percent of U.S. hospitals designated as a Magnet™ organization by the American Nurses Credentialing Center.

These accolades result from a relentless focus on quality, safety, expertise and innovation.

Key to the growth of Nationwide Children's Hospital has been the development of programs that focus on complex or rare health conditions. Many of these specialized services offer a level of expertise available only at a handful of places in the world.

Gastroenterology: Nationwide Children's Hospital leads the nation in the expert care of children with disorders related to how the intestine functions. Renowned gastroenterologists give families from all over the world new hope for their children by treating everything from behavioral-related problems to complex abnormalities.

Colorectal Surgery: With patients from more than 68 countries, the Center for Colorectal and Pelvic Reconstruction offers the world's leading pediatric colorectal, urologic and gynecologic care. Experts from more than 10 disciplines work seamlessly together to deliver best outcomes to children facing colorectal problems including anorectal malformations, Hirschsprung disease and gastrointestinal functional issues requiring surgical interventions.

Cardiovascular Surgery: The Heart Center serves as an international leader in research and quality improvement, working to conserve blood to reduce transfusions, becoming the first Certified Duchenne Care Center, running the world's first Hybrid Cardiac Operating Suite and Hybrid Cardiac Catheterization Suite, and offering 3-D MRI imaging prior to surgical intervention. The

center is also home to the first FDA-approved human trial to investigate tissue engineering to repair congenital heart defects.

Hematology, Oncology & Blood and Marrow Transplantation: In addition to providing blood and marrow transplants from all cell sources for a wide range of cancers and nonmalignant disorders, key collaborations include the Neuro-Oncology program (enabling autologous transplants for brain tumor patients) and the comprehensive Sickle Cell and Thalassemia program. Nationwide Children's Hospital is also home to the National Experimental Therapeutics (NEXT) Consortium, a national collaboration to expedite advanced treatments in pediatric oncology, hematology, and blood and marrow transplant.

Neurology and Neurosurgery: Ranked among the top six programs in the U.S., the Neurosciences Center is home to renowned experts in epilepsy, intracranial hypertension and neuromuscular disorders – including spinal muscular atrophy and Duchenne muscular dystrophy. Neurosurgical capabilities include the complete spectrum of multidisciplinary care from initial consultation through surgery, post-operative care, rehabilitation and beyond.

Interventional Radiology: Completing more than 5,300 procedures per year, imaging specialists provide skilled treatment of lymphatic malformation, complicated steroid injections, abscess drainages, cancer treatments, aneurysmal bone cysts, salivary gland ablation, dermoid cyst ablation and much more – all using advanced equipment to minimize radiation exposure.

Nationwide Children's Hospital has grown purposefully for more than 100 years, always keeping the wellbeing of patients at the center of its efforts. Now the world can't help but take notice. ^{AH}

For further information, contact the Welcome Center at Nationwide Children's Hospital. Email: WelcomeCenter@NationwideChildrens.org, or call +1 614 362 9127, or visit NationwideChildrens.org/International.



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Learn more, refer a patient or plan a trip:

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LIFE-CHANGING BRAIN SURGERY

gives South American boy a brighter future

Article provided by Cook Children's

Mirko Alvarez was your typical, energetic 3-year-old, enjoying life in his home country of Bolivia, until one day, when he started running a very high temperature.

After a couple of days, his parents, Diego and Tatiana, grew more concerned and made a doctor's appointment. Just hours before the appointment, Mirko began convulsing and was rushed to an emergency room. Scans revealed white spots on his brain and a neurologist said Mirko could have leukodystrophy, a rare and fatal genetic disease of the neuromuscular system.

"I cried a lot," said Diego. "It's the worst you could hear about your son, that he's going to die."

But a second neurologist was more hopeful. He said Mirko didn't have the fatal disorder; however, he needed urgent surgery to remove the portion of the brain causing the seizures. Diego and Tatiana were desperate to find help.

Diego's father learned about Cook Children's from a friend whose child was treated for a serious neurological disorder. That family hadn't been able to find any treatment for their child until they came to Cook Children's.

Diego called Cook Children's International Patient Services and had an appointment in Fort Worth, Texas, in less than two weeks.

"We evaluated him and ultimately decided a large resection of his frontal lobe would be the best answer to help him without hurting him," said Scott Perry, M.D., medical director of Cook Children's Neurology. "We also knew this initial resection may not be adequate, but wanted to try to preserve as much of his brain as we could."

David Donahue, M.D., a Cook Children's neurosurgeon, performed the surgery to



remove Mirko's left frontal lobe. Doctors prepared the family for the possibility that the surgery could impact the young boy's ability to speak, but when he came out of anesthesia, he looked at his parents and asked for his toy truck. Another fear was that he would be paralyzed on his right side, but after surgery, they noticed Mirko moved his right arm and leg while he was sleeping.

Following the initial surgery, Mirko's family planned to go home, as they had received the help they needed and the seizures were easier to control.

"It was difficult to tell Mirko's family that another major surgery was needed. But we felt under the circumstances, a second surgery was required to establish a better quality of life for him once he returned home," Dr Perry said. "It was really his only hope at that point."

While the first surgery removed his

left frontal lobe, a few weeks later, the second surgery disconnected the entire left hemisphere from the right side of his brain.

Due to a blood clot in his brain, Mirko required six blood thinner shots a day for two months. When the blood clot was gone, it was finally time to return home.

The surgery and treatment proved to be successful and Mirko is now seizure-free. His mental faculties are intact and he is able to speak. Physical therapy helped him regain the right side of his body and he is now able to walk.

"We are just so thankful to God for Cook Children's and everything they have done for us. We really are." Tatiana said.

For more information, please visit cookchildrensinternational.org

Phone: +1-682-885-4685

E-mail: international@cookchildrens.org



When things get complicated, you want one thing...*the best.*

And sometimes finding the best pediatric specialty care means traveling outside of the country. Located in Fort Worth, Texas, Cook Children's has been serving patient families for 100 years. Just minutes from the Dallas-Fort Worth International Airport, Cook Children's is a renowned integrated pediatric health care system in the United States.

At Cook Children's, each child's team of caregivers is connected to a system of pediatric specialists, clinics, and award-winning medical center. Children see the same specialists every day while an international care coordinator focuses on all the family's needs. From flight scheduling to accommodations to recreation, our dedicated international team handles every detail.



Specialty programs, services and procedures include:

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- Investigational new drug 18F DOPA

Level 4 Epilepsy Center

- Epilepsy Monitoring Unit
- Robotic surgery

Heart Center

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- Fetal echocardiography
- 3-D technology
- Surgical repair of the most complex heart defects

Hematology and Oncology Center

- Bone Marrow and Stem Cell Transplant Program
- Investigational MIBG therapy for neuroblastoma

Urology/Genitourinary Institute

- Ambiguous genitalia/ disorders of sex development
- Anorectal malformation
- Bladder exstrophy
- Cloaca
- Hypospadias
- Kidney transplant
- Urogenital sinus

Neurosciences Center

- Deep brain stimulation
- Motion analysis lab for patients with cerebral palsy and movement disorders
- Stroke and Thrombosis program

Orthopedic Surgery

- Amniotic band
- Arthrogyposis
- Hand and foot abnormalities
- Hip dysplasia
- Limb length discrepancy



CookChildren's

UCHICAGO MEDICINE

certified to offer breakthrough CAR T-cell gene therapy

Article provided by UChicago Medicine

The University of Chicago Medicine was among the first sites in the Midwest certified to offer a breakthrough gene therapy for pediatric acute lymphoblastic leukemia (ALL), which was approved last August by the US Food and Drug Administration.

Chimeric antigen receptor T-cell, or CAR T-cell, therapy, targets two common forms of cancer and has been used for nearly two years in clinical trials at UChicago Medicine to treat both ALL and diffuse large B-cell lymphoma (DLBCL) in adults. UChicago Medicine is currently treating both adult and pediatric ALL patients using this kind of cellular therapy.

"CAR T-cell therapy has revolutionized the treatment of acute lymphoblastic leukemia," according to cancer specialist John Cunningham, MD, chair of pediatrics and physician-in-chief at University of Chicago Medicine Comer Children's Hospital. "I came to the United States 30 years ago with the intent to work on therapies such as this. We need focused treatments that can eradicate particular types of cancer."

One of the cancers, B-cell acute lymphoblastic leukemia, is the most common childhood cancer. Pediatric ALL is a rapidly progressive leukemia that primarily affects children and young adults, from age 3 to 25. Nearly 3,100 patients under 21 years old in the U.S. will be diagnosed with ALL this year.

Used to supplement forms of cancer treatment like chemotherapy, radiation and stem cell transplants, CAR T-cell therapy works by using modified versions of a patient's own blood cells to target and destroy cancer cells.

UChicago Medicine is working with Novartis, the maker of Kymriah, as part of a national network offering the treatment to pediatric patients. The effort for pediatric patients is being spearheaded by Cunningham. The FDA approved the use of Kymriah last August in people up to age 25. Novartis announced its plans to use clinical outcomes to help determine the cost of treatment.

Ninety percent of pediatric patients with ALL who enrolled in early CAR T-cell clinical trials throughout the country went into lasting



Sam Tinaglia

remission. DLBCL patients often relapse after standard treatments, but those treated with CAR T-cell therapy have doubled the long-term survival rate. Now, about 50 percent of those patients appear to have lasting complete remissions.

CAR T-cell therapy does present a risk of serious, potentially life-threatening side effects, which include high fever, flu-like symptoms, infections and low blood pressure. The FDA requires special certification for all sites offering the treatment to confirm the institution is well suited to handle serious adverse reactions, should they occur.

The FDA approved Kymriah for use in pediatric ALL patients and in October 2017, the FDA approved the use of a Yescarta (axicabtagene ciloleucel, from Kite Pharma, Inc., now part of Gilead Sciences) for adult patients with relapsed or refractory diffuse large B-cell lymphoma, a form of non-Hodgkin's lymphoma.

Sam Tinaglia, 18, of Park Ridge was one of the first 100 children in the country to participate in clinical trials of CAR T-cell therapy for acute lymphoblastic leukemia. Diagnosed in 2003 at age 5, Tinaglia relapsed for the first time five years after initial treatment. Over the next seven years, doctors tried more rounds of chemotherapy and a bone marrow transplant. With each recurrence, his chances of survival lessened.

"We thought we had reached the end," said Sam's mother, Suzie. "But then Dr Cunningham told us about the CAR T-cell clinical trial that was giving hope to kids like



Sam Tinaglia embraces his oncologist, John M Cunningham, MD

Sam, who had no other options."

In 2015, during his junior year of high school, Cunningham referred Sam to Children's Hospital of Philadelphia to receive CAR T-cell therapy. Although he experienced some of the serious side effects, he recovered after treatment in a pediatric intensive care unit. "A few weeks later, they sent me home and that was pretty much it," said Sam, who just started his freshman year of college. "I'm obviously very happy, because my cancer, hopefully, is gone forever."

Sam will continue his care at Comer Children's, where he received most of his treatment for ALL and is now followed by experts in the Childhood Cancer Survivors Center.

"For Sam, CAR T-cell therapy was the exact treatment he needed," said Suzie. "And we are so thankful it worked out. We never thought we'd get to this point."

For more information, please visit our website at <http://international.uchospitals.edu> and Facebook page at <https://www.facebook.com/UCMArabic/>.

A revolutionary cancer breakthrough:

A LIVING DRUG.



*Sam Tinaglia
Leukemia Patient*

There's a new cancer breakthrough that's making world news - and helping people fight cancer right here in Chicago. Clinical trials demonstrated the effectiveness of CAR T-cell therapy, now approved for use in pediatric and adult patients with certain types of leukemia and lymphoma, as well as investigational use in several other cancer types. Sam Tinaglia's own white blood cells were supercharged and reintroduced into his bloodstream, with instructions to find and attack cancer cells. Thanks to this "living drug," he's now in full remission. It's an uncommon approach, and UChicago Medicine is among the first sites in the Midwest certified to offer CAR T-cell therapy.

See how this breakthrough helped Sam battle cancer at UChicagoMedicine.org/DefeatCancer.

Or call 1-844-482-7823 to learn more.



AT THE FOREFRONT
**UChicago
Medicine**

Kuwait family turns to Lurie Children's for specialized care

Article provided by Lurie Children's Hospital of Chicago

The Ahmad family has travelled the past two years from Kuwait to come to Ann & Robert H. Lurie Children's Hospital of Chicago to receive treatment for their son, Ali's spina bifida. As an extraordinary place for healing and family-centered care, the hospital's evidence-based design and advanced technology helps our outstanding caregivers provide quality care to the world's most critically ill children.

The family was connected to Lurie Children's Hospital through their government, because it is one of the top 10 hospitals in the U.S. Lurie Children's ranks 7th nationally and qualified for the Honor Roll in the 2017-18 *U.S. News & World Report* Best Children's Hospitals rankings. The Honor Roll designation is awarded to hospitals that scored in the top 10 percent in at least three specialties. It has established medical and surgical leadership that provides cutting-edge and thorough treatments for the most complex pediatric needs, including:

- Brain tumors
- Cancer care
- Cardiology and cardiovascular surgery
- Neurosurgery
- Pediatric surgery
- Plastic surgery
- Transplants

"The staff is very nice and the doctors are very professional. We are happy," stated Ghadeer, Ali's mom. Pediatric providers have collaborated in overseeing Ali's specialized treatment. Lurie Children's medical staff includes over 1,445 physicians and 200 Advance Practice Nurses and Physician Assistants in 70 pediatric specialties. Lurie Children's is the largest pediatric provider in the region, with more than 744,000 patient visits and cared for more than 208,000 individual patients in fiscal year 2017.

"The international office arranged everything before we came," stated Ghadeer. The International Patient Services (IPS) department at Lurie Children's works with patients and families from outside of the United States



seeking pediatric healthcare services. They are committed to providing family-centered care to all patients. The IPS department assists families through every step of receiving care at our institution, from referrals to treatment and discharge. The team provides immediate access to interpreters through a combination of in-person interpreters, video and telephonic interpretation. The IPS department also aids families with their plans to return home.

The Ahmad family greatly appreciates all the work that has been done by the staff and is pleased how every request for Ali's needs was met. Lurie Children's is not only focused on treating children's illnesses, but is also committed to offering creative and educational programs, activities and other resources to support the patients and their families emotionally, socially and developmentally. Families have access to an interdisciplinary team, which includes child life specialists, creative arts therapists, activity coordinators, teachers and volunteers to help patients and families with respite and distraction. Together with the patient's medical team, they address the needs of the whole family for the best



The Ahmad family from Kuwait received treatment for their son, Ali's spina bifida, at Ann & Robert H. Lurie Children's Hospital of Chicago

possible patient experience.

The Ahmad's have already recommended Lurie Children's to other relatives and families in Kuwait. They returned home safely and Ali is reunited with his two older sisters.

For more information, or to contact IPS call 312.227.4550 or e-mail IPS@luriechildrens.org and to learn more about Lurie Children's Hospital and the International Patient Services, visit luriechildrens.org/international



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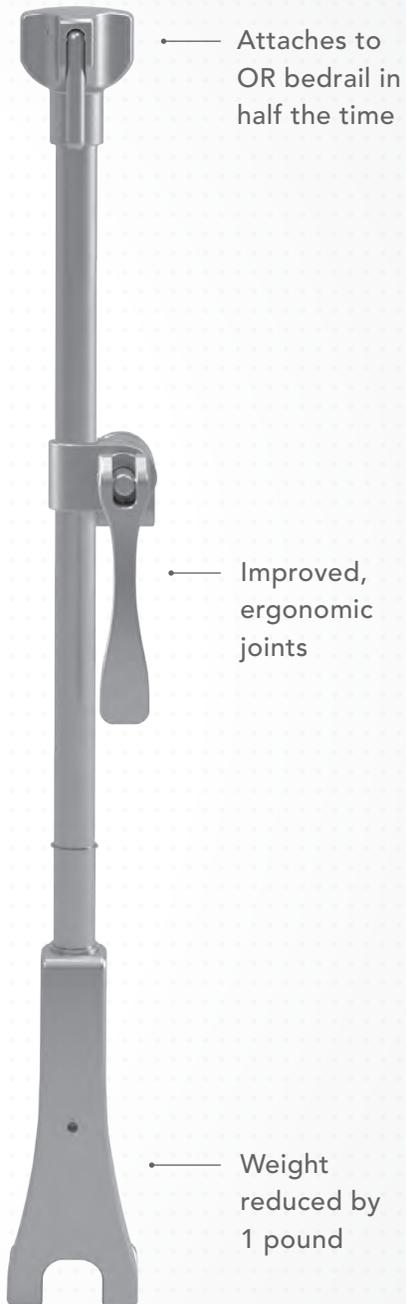


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Risk Management in the EMERGENCY DEPARTMENT

By Dr Mazin A Gadir, Senior Consultant and Advisor, The Executive Office for Organizational Transformation, Dubai Health Authority, Dubai, UAE

As we define the process of risk management in the emergency department, it is important to define the concept of risk in its broadest meaning: "Risk is an uncertain event or condition in the future that, if it occurs, has a positive impact (and thus called an opportunity) or a negative impact (and called a threat)". Meanwhile, the science of risk management covers "all the processes concerned with conducting risk management planning, identification, analysis, responses and monitoring and control on a project."

Assessing and managing risks is the best weapon that can be used to avert catastrophes. By evaluating the action plan for potential problems and developing strategies to address them, one can improve one's chances of a successful, if not perfect, execution and implementation of services. Even the most carefully planned activities can run into trouble. No matter how well a plan is orchestrated, there is always a chance to encounter unexpected problems. Team members get sick or quit, resources that you were depending on turn out to be unavailable, even the weather can throw you for a loop (e.g., a hurricane).

To understand risk in the Emergency Department (ED), it is important to examine the workflow of the patient journey in an ED. The Emergency Department is a dynamic and often unpredictable place, which makes it a high-risk inducing environment. The staff of an ED may see anything in the course of a shift, ranging from a common cold or upset stomach that are treated with a simple medication to a trauma or cardiac arrest that requires full resuscitation efforts. Speed, efficiency, and

accuracy of assessing, diagnosing, and treating patients are essential, due to the unpredictable and often heavy flow of patients through an ED. A visit to an ED involves a complex series of decisions, interactions, and activities, which will make it vital for risk planning and assessing to be accurate. A systematic approach that facilitates fast, efficient and accurate patient documentation and treatment within defined processes is required to minimise unexpected failures or human errors.

ED's can have multiple areas within the department, such as Minors, Majors, Resus, Observation and Treatment. Emergency Departments can be split into two types: Minor Injury Unit (MIU), Acute ED, etc.

Minor Injury Units, as the name suggests, tend to deal with patients with minor injuries. These units often only consist of 2-3 treatment areas and a waiting room. Most are also nurse-led units staffed by Emergency Nurse Practitioners who will see, treat, and discharge patients. Following clinical protocols and care pathways will enable a more controlled and safe environment for patient treatment. The workflows in these units can differ greatly depending on its size, hours of opening, and number of patients seen.

Typically, patients self-present and are fully registered. In smaller units, the nurse will complete this registration. Patients will then wait to be seen in a queue based on length of stay. Young children and those clearly requiring more attention that is urgent will be fast-tracked.

Acute Emergency departments are larger units that require a more robust workflow. Patients can enter the ED either by ambulance

or on their own. Whilst the initial workflow between these patients may differ slightly, the same systematic approach is taken with both.

The vast majority of patients will self-present to the ED receptionist. Once they are fully registered they will be seen by a nurse to triage or stream them. A front sheet will be printed on completion of registration. This will include demographic information and the reason for visit. This sheet can then be combined with an investigation sheet.

Triage involves a brief assessment where the patient will be assigned a priority which will dictate the order in which they are seen. Clearly patients who require immediate investigation and intervention will be moved straight into a room. Those with lower priority will be asked to wait in the waiting room until called by the doctor or primary nurse. The Triage Nurse will decide which area the patient is more suitably seen (Majors or Minors). They will assign the patient to that particular queue. The nurse in charge of the assigned area will look through the patients in their queue, ordering the patients on a combination of their triage category and length of stay.

Patients arriving by ambulance will be brought to a specific area where they can be streamed. This is often to the nurse in charge of majors. The nurse will complete a brief assessment to ascertain where they are best treated. The patient may immediately be assigned a bed in Majors, moved to Minors or Resus, or moved into the waiting room to be formally triaged from there.

Patients assigned to a bed will be seen by their primary nurse. The nurse will complete the formal triage and complete their initial ▶

assessment. This will include vital signs. Hence, it is important to ensure the comprehensiveness of data entry at the triage stage.

Although doctors will move around the different areas of the department depending on the demand, they tend to concentrate on the area they have been assigned for their shift. After assessment, the doctor will document their findings and plan of action. If the patient has been in the hospital before, the doctor may ask reception to request any previous notes from medical records. They may also request investigations such as blood and X-rays, and treatments such as initiation of intravenous fluids and drugs. The primary nurse will be informed of these requests verbally and/or sometimes using a whiteboard. Care for the patient is a continual process carried out at any point as needed prior to, during, and after diagnostic tests are complete, in collaboration with the ED doctor. Interventions and course of care are based on the patient's needs.

Patients that are to be discharged home from the ED will be given prescriptions (these will have to be collected from the hospital pharmacy), and/or any patient education documentation they require. A discharge summary also will be completed by the ED doctor and sent to their family physician or general practitioner (GP).

Should the ED doctor decide that the patient might need admission, they will contact the appropriate on call team (e.g. Surgery, Medicine, etc). If the team accepts the patient, the process of arranging a ward bed is initiated. Hospitals with admissions units, such as Medical Admissions Unit (MAU) may now transfer the patient to the MAU to await assessment by the on-call team. After this assessment is complete, the patient may be moved to the ward, or discharged home.

With hospitals that do not have an MAU, or when the MAU is full, the admission to ward process is initiated. Large hospitals have teams of Bed/Site managers responsible for assessing the current bed state and assigning new admissions to suitable beds. Once the decision to admit (DTA) has been made, the bed manager will be contacted either by the nurse in charge or the patient's primary nurse. Once an available bed has been found, the bed manager will ring back to the ED to let them know where the patient will be going. In the meantime, the primary nurse will be completing the documentation

necessary for the admission. The receptionist will make up the hospital notes. The primary nurse generally contacts the ward to verbally handover the patient. When the patient is unstable they will accompany the patient to the ward and handover in person.

Not all patients can be fully registered on admission to the ED. The patient may arrive unconscious. In this situation, the patient will be given an emergency code so that they can be entered onto the system and investigations and treatments can be initiated immediately. If the patient is identified during the admission, the receptionist may combine the patient notes, or this process will be managed by medical records.

Within the ED environment, managing operational risk is vital in the following dimensions:

- People and skills
- Processes and procedures
- Systems and technology

Emergency clinicians (physicians and nurses) face the challenge of treating patients in short encounters with the possibility of not seeing the same patient again. These short spells of interaction and the rapid pace of the workflow in the ED represents fertile ground for unexpected circumstances to take place any time. Challenges occur under circumstances that could range from minor injuries to life-threatening cases. The rapid decision-making process characterises the nature of a high-risk environment which requires managing risk through well-established controls and procedures.

There are many factors that contribute to increased risk in an emergency department:

- Lack of knowledge or experience
- Incomplete demographic information

collected at the ED registration

- Inadequate clinical history documented by the triage or assessment nurse
- Failure to perform adequate examination or investigation
- Mis-diagnosing the patient due to lack of evidence-based assessment
- Inability to interpret lab or radiology investigations
- Mis-treating the patient based on incorrect documentation or human-induced errors
- Lack of communication is a significant threat that might result in severe consequences
- Incorrect decision not to admit a patient and instead opt to discharge the patient

These are examples that show how a sense of constant analysis and use of data will enable better risk planning and more effective mitigation of threats. The automation of the ED is a solution to build robust risk management process by utilising and analysing the all the data collected. Digital innovation will enable the ED staff to produce effective tools and policies to mitigate risk and predict threats.

In conclusion, the working environment of the ED is a unique, complex, and dynamic environment. This is reflected in the varying, often overwhelming volume of patients seen in busy EDs, as well as in the range of acuity of clinical encounters. With decisions being made under time constraints, often with incomplete information, emergency physicians are highly vulnerable to error and claims of malpractice. Thorough clinical documentation is critical not only for protecting emergency clinicians but also for ensuring the continuity and quality of care for patients. **AH**



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The importance of standardised field medical data gathering during **HUMANITARIAN DISASTERS**

By Ives Hubloue, MD, PhD, Research Group on Emergency and Disaster Medicine, Vrije Universiteit Brussel, Brussels, Belgium

One can no longer rely on goodwill and good intentions to manage mass casualties in a disaster situation. As in all other branches of medicine, disaster medicine must rely on a solid and evidence based foundation. Disasters (natural or man-made) and the number of individuals affected by them are yearly increasing. The objectives of disaster medicine are to prevent, reduce and mitigate the effects of disasters on the health of affected populations, to restore health conditions to the pre-disaster situation and to protect or re-establish health services and facilities.

Emergency versus Disaster Medicine

Health professionals must recognise that disasters are qualitatively different (rather than merely quantitatively different) from smaller events such as encountered in daily emergency medicine practice. In contrast with these lesser events, disasters place community systems under extreme stress and responders face new and different demands. Thus, disasters may generate a whole host of problems for which routine emergency procedures are not well adapted. The management of the health effects of a disaster is one of the most difficult tasks that must be performed by health professionals by doing 'the best for the most' versus 'the best for everyone'. It requires special knowledge and professional skill to provide healthcare of quality in a primitive or hostile environment (e.g. terror attacks) and an ability to innovate and organise a disaster medical response system.

Are we handling disasters as effectively as we think we should be?

Several studies on medical disaster preparedness and lessons learned from recent disasters indicate a lack of education and training of the different parties involved in the medical management of disasters. Furthermore, health professionals and researchers from a broad spectrum of



disciplines and specialties contribute to the knowledge base of disaster medicine science. Although multidisciplinary can be a strength, it can also be a hindrance due to the lack of mutual understanding between people from different backgrounds. Moreover, there is large variation in the organisation of the disaster medical response in different countries and even within countries. Without a standardised framework for describing and reporting the features that impact on disaster medical response, it is very difficult to compare results of disaster medical response evaluations and even more difficult to identify best practice. This lack of a common language also hinders intra- and interdisciplinary collaborations, appropriate training and the relationship between researcher and practitioner.

Looking for evidence: Standardised data collection by Emergency Medical Teams

Disaster medical planning and response are only as good as the assumptions on which they are based. Many of these assumptions are incorrect and not based on systematically collected evidence. Our current knowledge of disaster medical management relies on

expert opinions and individual descriptive reports, which often lack scientific rigour. Databases available for disaster medical research are underdeveloped, incomplete and inaccurate. Disaster medical response principles, concepts, structures and processes are not evidence-based. Moreover, research that analyses the effectiveness and efficiency of disaster interventions on the health outcomes of disaster survivors is very scarce. One of the reasons is the fact that randomised clinical trials have been described as unable to accommodate the complexity that characterises disaster medical response, and are impossible or ethically unacceptable – or both – to be carried out in disaster situations. Nevertheless, there is an increasing awareness among the disaster medicine community of the need to collect empirical data derived from formal research or systematic investigations, to allow researchers to determine the effectiveness of disaster medical response interventions and the impact of the response on patient outcomes. This collection of consistent data should lead, over time, to the development of a consensus on, and

validation of evidence-based processes and outcome indicators. In a field of research where data will always be difficult to obtain – as most healthcare providers prioritise the provision of care to a large number of victims over the documentation of medical and operational management – the lack of universally accepted standards for collecting and reporting data will hinder or make it impossible to compare research findings in different types of disasters or across different types of interventions.

Based on the empirical data collected by (enhanced) type 1 emergency medical teams (EMT) in five different humanitarian emergencies, our research group was able to define pathology patterns this type of EMT will face, and propose recommendations with respect to the staff composition and medical logistics of these EMTs over time.

Injury patterns may change according to the type of disaster or humanitarian emergency, but patterns of communicable and non-communicable diseases do not differ strongly across different types of disasters.

Communicable diseases are proportionally more prevalent among children (65-95%) than among adults (30-55%). Most infectious diseases are of respiratory, digestive or skin origin, and are mainly indirect consequences of the disaster, when affected populations become homeless and are relocated to IDP or refugee camps. Lack of shelter, sanitation, safe water and food creates the very conditions of infectious diseases. Additional communicable diseases are the result of endemic agents in the affected area. Non-communicable diseases are mainly caused or exacerbated by worsening of the health conditions, by a direct impact of the disaster or by lacking routine therapy for chronic disorders.

Differences in pathology patterns can further be determined by a number of other factors such as time of EMT deployment after the occurrence of the event, the type of EMT deployed and the environmental context of the affected area. Injuries will be most prominent during the first two weeks after a sudden onset disaster. Different types of EMTs will attract different types of pathology: major trauma will be directed to type 2 and 3 field hospitals and undamaged hospitals which will be transformed into trauma centres, with the result that more non-injured patients are referred to type 1 EMTs. Last categories of patients who

will present to EMTs are pregnant women, women in labour, new-borns, and those with health problems for which an appropriate treatment is locally unavailable or too costly.

The results of these studies indicate that the staff and resource composition of EMTs should be flexible and dynamic in time, in order to meet the changing needs of disaster victims in the subsequent phases of the humanitarian response. There is an early role for emergency surgeons, anaesthesiologists, intensivists, emergency nurses and their ancillary staff to be deployed in type 2 and 3 field hospitals, but patients needing urgent surgery or follow-up will present to type 1 field hospitals as well. There is an early role in all types of EMTs for emergency physicians, paediatricians, gynaecologists, midwives, psychologists, pharmacists, and interpreters. Public health specialists have an important role in preventing the emergence of infectious diseases. EMTs deploying after the first week of the onset of the emergency should operate as a “subsidiary” emergency department and be prepared to treat mostly infectious diseases, non-communicable disorders and minor surgery. EMTs can scale-up in the second week with internists, reconstruction surgery and rehabilitation teams, maternal health specialists, and psychologists. As many patients will require long-term follow-up, it is essential to include local staff in the EMTs as soon as possible. The actual Interagency Emergency Health Kits should be adapted to the specific needs of disaster victims in the different phases of the response, by adding medications and supplies for respiratory, digestive, ophthalmic and non-communicable diseases, as well as rehabilitation materials, and paediatric formulas of essential medicines.

The template for uniform recording and reporting medical data developed in the five humanitarian emergencies, based on empirical data collected during the response to different disasters, should be the start to initiate an Utstein-style consensus process including all stakeholders, in order to define a final set of medical data to be recorded and reported in disaster situations. The use of such a template will make a substantial contribution to better establish the effectiveness of medical interventions on the outcome of disasters patients. Implementing Utstein-style templates is always challenging. Whether the template will have the desired impact of improving the science of disaster

medicine can only be answered by the future use and justification of the template.

Simulation and modelling in disaster medicine research

Uniform medical data gathering and the identification of the key elements of the response will facilitate the development of conceptual models. These models are describing a comprehensive approach to managing the medical assets during an acute response and to coordinating across the various response tiers. Models and simulation, if used correctly, can support experimental research on disaster response management. Simulations using disaster medical response models can provide evidence-based data for an optimal use of resources when applying specific response interventions or procedures and allow comparisons of the efficiency of response interventions or procedures in order to define best practice, taking into account the contextual factors of the affected area and the specific disaster scenario.

Conclusion

Education and training in disaster medicine and management can only be done when a solid and standardised scientific basis is present. The cornerstone for a solid scientific basis is the collection of reliable experimental (medical) data. A lot of work has been done already but there are still challenges for the future. Our ultimate goal will be doing ‘the best for the most’ ^{AH}

References available on request.



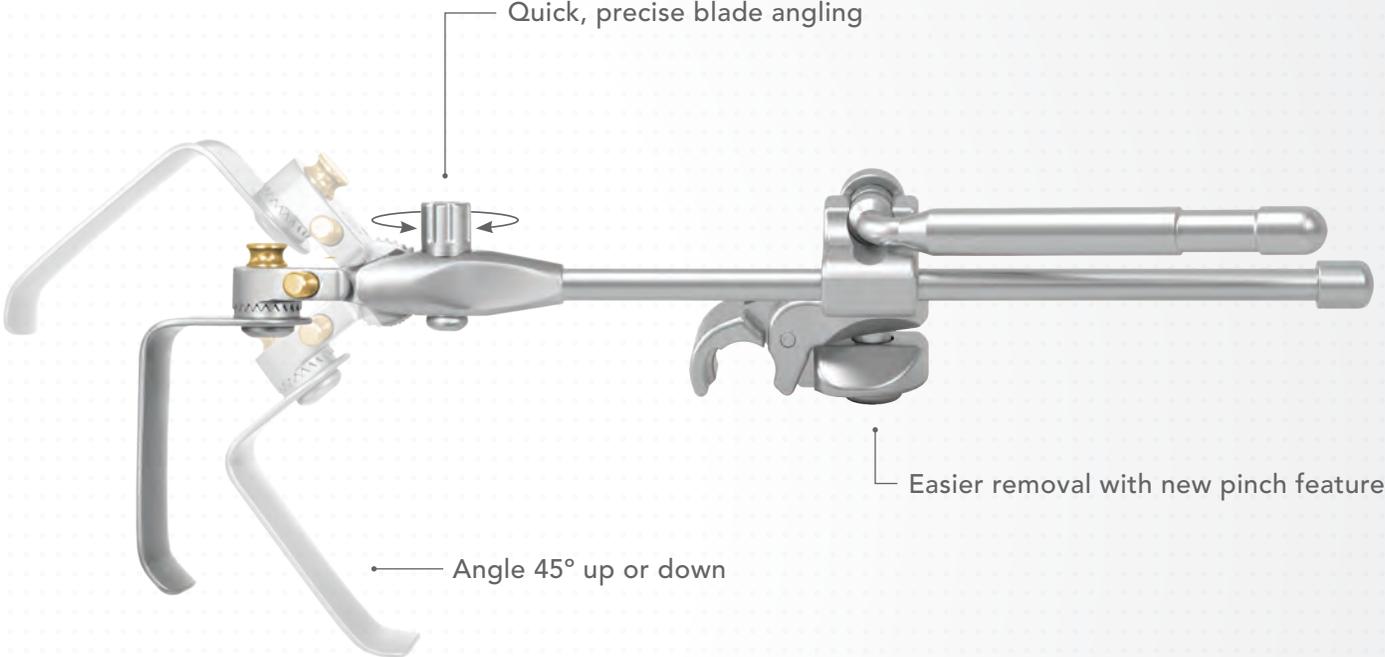
Ives Hubloue is the Chair of the Research Group on Emergency and Disaster Medicine at the Medical School of the Vrije Universiteit Brussel

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*His Excellency Humaid Al Qutami, Chairman
of the Board and Director-General of the
Dubai Health Authority*

Innovation Centre to promote healthcare innovations

Dubai Health Authority unveils plans to establish Innovation Centre to create an environment for collaboration with the private sector in the field of healthcare innovation

Article provided by Dubai Health Authority

In line with the UAE vision and Dubai Health Strategy 2016-2021 that seeks to make the population of the emirate healthier and happier by providing world-class healthcare services and fostering creativity and innovation, the Dubai Health Authority has unveiled plans to establish an Innovation Centre in collaboration with the private sector to support healthcare innovation.

The new Innovation Centre will be set up behind Rashid Hospital in Dubai. The initiative intends to promote public-private collaboration in the field of healthcare innovation and also provide

a permanent base for entities keen on supporting medical innovation in Dubai.

Innovation: The future of better health

Highlighting the importance of creating an environment that is conducive to innovation, His Excellency Humaid Al Qutami, Chairman of the Board and Director-General of the Dubai Health Authority, says: "Over the years, we have seen advances in medicine which have directly contributed to better patient outcomes. Health is a sector that directly affects us all and innovation in healthcare can save lives, improve patient outcomes, promote health and well-being. So, undoubtedly, innovation is the future of better health. Our aim is to promote an atmosphere that is conducive to innovation, not just for medical treatment but also in technology, healthcare management, pharmaceuticals, medical devices, etc so that all aspects of the health sector develop and thrive. Innovation cannot take place in isolation and thrives on collaboration; we are keen to work with innovators, healthcare entities, scientists and researchers so that we can improve healthcare outcomes and focus on improved patient care and experience."

DHA is currently working with the private sector to establish the most suitable model to foster the Innovation Centre concept and to ensure round-the-year activation and participation. In the initial meeting held with the DHA team and members of the private sector in April, participants were provided a tour of the construction site of the Innovation Centre. Members from both the public and private healthcare sectors offered their inputs and a brainstorming session was held to discuss the way forward.

'Important pillar of Dubai Health Strategy'

According to Dr Mohammad Al Redha, Director of the Department of Organisational Transformation at DHA, "In line with the vision of our leaders and in line with the DHA Health Strategy 2016-2021, innovation in healthcare is an important pillar of our strategy. For us, innovation means the ability to harness new technologies, to implement newer methods of healthcare delivery and management in order to provide patients with improved healthcare and make their lives better. At the end of the day, patient-centred care is our priority and improving their lives and providing them with happiness is our primary focus. Thus, for us, innovation is the vehicle that will revolutionise healthcare and directly lead to patient well-

being and happiness."

He highlighted that as part of the DHA strategy, the innovation programme is designed to promote innovation and efficiency and ensure that Dubai residents and visitors have access to high quality services across the continuum of care. The innovation programme aims to introduce innovative care models to fill existing care delivery gaps and enable integrated, cost-effective, patient and innovation-oriented care delivery.

3D Printing and Artificial Intelligence

DHA has been working on the implementation of latest technologies such as 3D printing in healthcare and artificial intelligence.

Dr Bassam Mahboub, Consultant Pulmonologist and the head of pulmonary medicine unit and the program director for care model innovation in DHA, has stated that over the course of the past year, DHA successfully deployed 3D technology across its dental services department and carried out complicated surgeries using this technology. "The DHA also worked with the private sector on 3D-printed artificial legs that was used to provide amputees with a new lease of life," he added. "One of the amputees described how her 3D-printed foot was much closer to the feeling of having an actual foot compared to the previous one she was wearing. One additional benefit of 3D printing is the cost-effectiveness of the technology, which makes it affordable across a wide spectrum of patients who need it."

Presently DHA is working with the private sector on the implementation of AI in medical fitness screening and in other areas of healthcare such as stroke detection, management and diagnosis as well as rehabilitation.

First radiology AI Algorithm

Earlier this year at the 2018 Arab Health Exhibition & Congress in Dubai, UAE, the DHA announced that it would use Artificial Intelligence (AI) to sort out all chest X-ray scans required for mandatory medical fitness for residency purposes. This is expected to streamline the system, cut down processing time and provide a more efficient and consolidated system for issuing results. At the event, the DHA signed a Memorandum of Understanding (MoU) with Agfa HealthCare for validation of the first radiology AI algorithm in the UAE. The MoU was the culmination of the joint efforts of the DHA and Agfa HealthCare for over a period of two years during which the

use of AI was reviewed across the radiology departments of DHA's medical fitness centres.

"The DHA is keen to foster the use of technology in the health sector to improve efficiencies, enhance healthcare management and overall workflows and most importantly, to further improve patient-centric care," stated His Excellency Humaid Al Qutami. "Utilisation of AI in the health sector is also in line with the UAE Strategy for Artificial Intelligence. The DHA decided to use AI for X-ray imaging across medical fitness centres because of the scale of the service and the fact that it will greatly enhance work efficiencies and will lead to optimum utilisation of manpower. The move will have a significant positive impact on the overall medical fitness system."

Announcing the preliminary results of the Chest X-ray AI Algorithm deployed across DHA medical fitness centres, the DHA revealed that upon completion of Phase One of onsite validation in early January 2018, and on analysis of preliminary data, the algorithm was able to correctly identify diseases in Chest X-rays approximately 90% of the time. Phase Two results in March 2018 showed further improved sensitivity to 95 per cent.

The Algorithm processed approximately 4,900 Chest X-rays, and two DHA MFC radiologists reviewed the findings detected by the AI Algorithm.

"The results are very promising," said Dr Mohammed Al Redha. "We will work together to establish an enterprise imaging strategy for the DHA to enable multi-speciality medical imaging consolidation. DHA will establish a framework of Artificial Intelligence workflow to augment radiology imaging, including in the area of detecting diseases and we will collaborate to validate machine-learning algorithms in development."

According to Chiho Rim, Co-Founder and Chief Strategist at DrFive - one of the ten firms that took part in the initial meeting with DHA at the Innovation Centre, "Our technology uses AI to detect the exact type of stroke the patient is suffering from and we are able to detect this as AI can read the MRI and CT scan and immediately present the doctor with the needed information. We have conducted trials in hospitals in South Korea."

Other firms present at the meeting included Etisalat Digital, Novartis, HCl group, IBM, Credit Swiss, Fasaisal, MSD and Cognitive Healthcare International (CHI). **AH**

Dr Ibtesam Bastaki, Director of Investment and Partnership at Dubai Health Authority



INVESTMENT OPPORTUNITIES

in the healthcare sector in Dubai

By Kamakshi Gupta, Communications Analyst at Dubai Health Authority

The Dubai Health Authority's health investment strategy 2017-2020 focuses on the numerous investment opportunities in the healthcare sector to provide medical care according to global best practices, while attracting investors to contribute to the development of health services in primary care, chronic diseases, and specialised centres for the treatment of diabetes, cardiovascular diseases, among others.

With the launch of its health investment strategy 2017-2020, the Dubai Health Authority (DHA) aims to promote Dubai as a viable and competitive hub for need-based investment in healthcare. As Dubai's healthcare sector offers significant opportunities for investors, the strategy also aims to guide and support them to build sustainable public-private partnership models in healthcare in Dubai.

However, in recent years, the healthcare providers' landscape has changed significantly, leading to an overcapacity for certain services. So, the question really is: how will this service add value and will it prevent health investment in already saturated spaces?

"Absolutely, it will," says Dr Ibtesam

Bastaki, Director of Investment and Partnership at the DHA. "While it is a fact that some services and catchments have sufficient supply, or some are crowded and pose a risk for overcapacity, there are gaps in a number of specialities and services. Innovations in primary care models, centres of excellence in certain specialities, home-based care and rehabilitation services are key areas of investment potential."

She added that the healthcare sector in Dubai has been growing driven by the population rise and an increase in private healthwvz infrastructure. "If you compare global estimates and look at the manner in which the population of the Emirate is rising, by 2025, at the current rate, we can expect a gap in in-patient beds, in price-positioning and in specialities. Therefore, there certainly is potential and our aim is to foster and promote health investment in areas where there are lack of services or where there are

"Innovations in primary care models, centres of excellence in certain specialities, home-based care and rehabilitation services are key areas of investment potential."

opportunities for growth," says Dr Bastaki.

"Several countries have dedicated healthcare investment promotion agencies and frankly it is a better and more efficient way to operate. It is a win-win situation for the investor and the health sector, and patients benefit the most because it prevents oversupply, leads to availability of health specialists across various disciplines and fosters the growth and development of specialised and super-specialised health services," she explains.

According to Dr Bastaki, the health investment strategy 2017-2020 was developed after conducting a need-based analysis and after extensive stakeholder consultations on the current healthcare investment landscape with more than 40 interviews conducted with senior leaders from both the public and private sectors.

Dr Bastaki adds that the manner and type of care needed is also changing drastically due to a number of factors, creating opportunities along the way for companies that are quick to adapt to this change.

"Rise in ageing population, rising prevalence and risk factors for chronic diseases, and changes in technology and new innovations in the delivery of care are

factors that will change the global healthcare landscape in the next decade," she opines.

"To keep up with these changes and provide patient-centric care with regular monitoring and follow-up from the comfort of the patient's home, I expect that there would be significant growth in remote patient monitoring and coordinated care delivered through telehealth platforms and solutions," explains Dr Bastaki. "This presents a huge opportunity for Information Technology (IT) healthcare firms to dive into the market and provide solutions that will cut costs, lead to closer follow-up and care particularly for the elderly or need-based patients that find it inconvenient to travel to clinics regularly. Of course, there are certain stringent criteria such as quality of care the technology will provide, its efficiency, ease of use, etc., but the point is that there is enough and more opportunity."

In terms of traditional clinic-based

services, she says, "Certainly, primary healthcare is a priority focus especially for regular preventive screening and early detection or as a first point-of-contact for medical cases that are not critical, and also for regular follow-up and care. There is a huge opportunity in that speciality particularly as we aim to continue enhancing the specialities we offer through the primary healthcare centres. A lot of the care that is being delivered in hospitals today will shift to an outpatient setting - leading to the growth of ambulatory care where a lot of procedures can be done in a day care setting and home-based care. Over the next few years, we can expect to see further streamlined care and continuum of care starting with primary healthcare right up till home-based care using the latest healthcare technology."

According to Ahmed Faiyaz Sait, Advisor, Investments & PPPs at Dubai Health Authority, "There will be more of a higher demand for one-stop-shop clinics and medical centres for specialised services like orthopaedics and diabetes and this is currently the trend in the emirate. The main driver of this change will be bringing a multi-disciplinary approach and deep clinical expertise to work on a particular disease or condition that

improves and delivers better outcomes. There is more to be done on how care delivered at specialised centres is integrated with primary care and home-based healthcare (remote patient monitoring) and we hope to see such care innovation taking place soon. The DHA has clearly laid out the areas of focus over the next two to five years and the department is keen on providing the dedicated investment promotion and facilitation efforts to support priority in Dubai." ^{AH}

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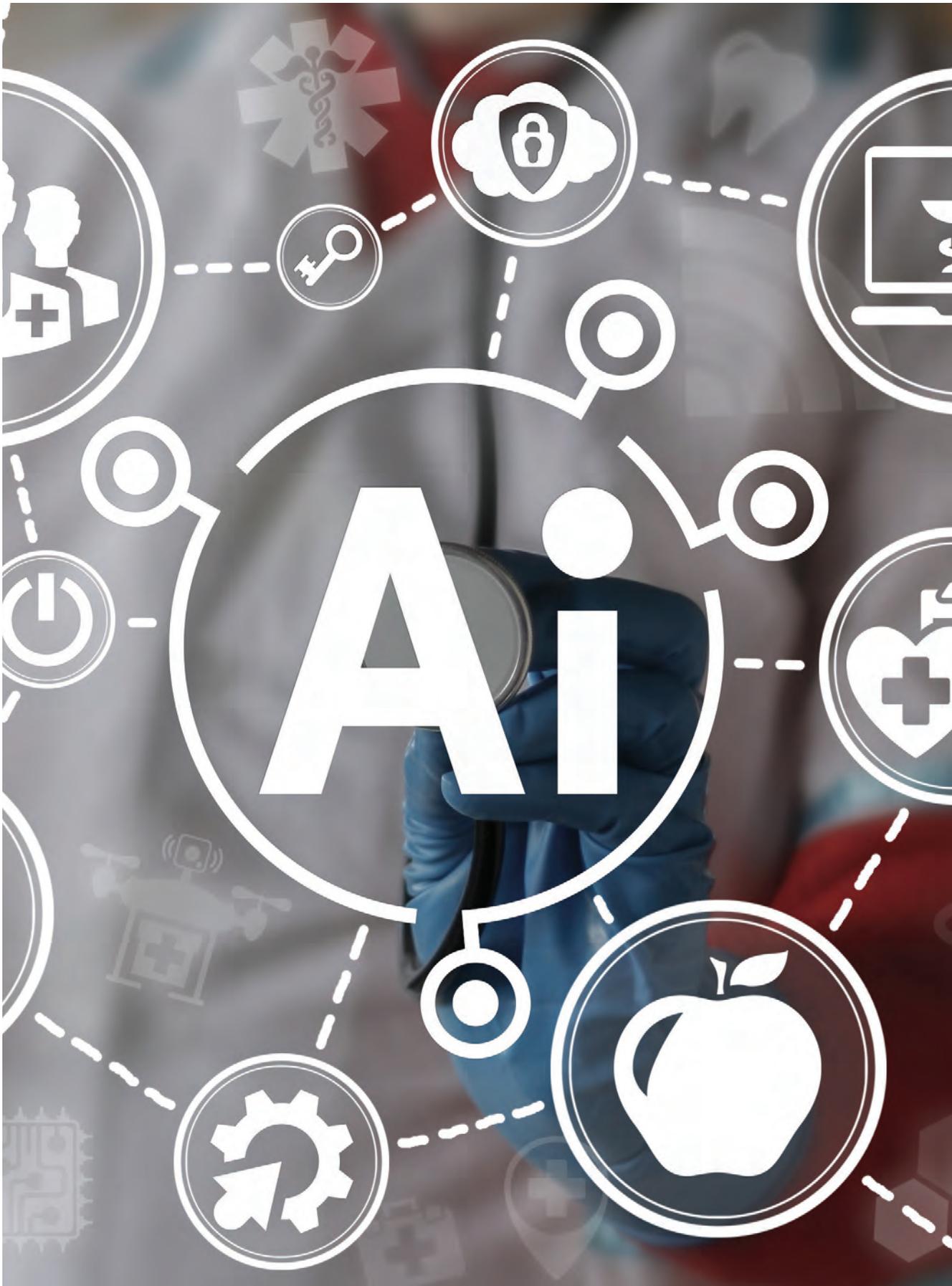
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THE DOUBLE-EDGED SWORD

of AI and machine learning on healthcare data security

By Jim Massey, Senior Business Developer – Innovation, Healthcare Advisory Practice, Cerner Middle East

The UAE government is leading the way in establishing the necessary integrated and secure data ecosystem to expedite the implementation of future technologies like Artificial Intelligence (AI) in healthcare, which use data from many disparate sources to produce unprecedented services that will transform all aspects of people's wellness and everyday life. AI and machine learning offers hope in reducing the risk and impact of cyber-attacks on patient data, but also opens doors to potential wrong doers - "The Bad Guys" - by its very nature.

Security threats are, and always have been, major concerns to healthcare organisations due to the value and vulnerability of the clinical data that is being recorded and distributed. The value of the data comes from the fact that it directly affects our ability to safely treat patients. Due to its content and historical nature it can be very big, so it takes a long time to rebuild, and it contains more than just clinical data. Also included are personal, financial, and demographic data which allow it to be used for wider identity theft and payment fraud. It is immutable and persistent that in the event of a data breach you can change your email address, your credit cards, their passwords, PINs and account numbers, but you cannot change your mother's maiden name. The vulnerability comes from the fact that there has been a revolution in healthcare

with the interconnection of systems, cloud computing, Internet of Healthcare Things (IoHT) and mobile devices and the changes in working practices of clinicians such as remote monitoring, telemedicine, and working from home. This revolution in big data, AI and care has not always been matched with the security awareness, policies, practices, and budgets of healthcare organisations.

AI itself provides an open door to bad guys who wish to exploit this vulnerability, even though in most countries healthcare data is protected by data or privacy laws, and any breaches or inability to guard it properly can have legal and financial implications. Most custodians of patient data are not as aware of the changes that the use of AI imposes. As it is used more and more in patient care it needs access to larger and larger data sets from multiple sources, not just the electronic medical record (EMR). Not all of these sources adhere to the same rigour of data protection. Indeed, as most AI platforms need to consolidate large amounts of data and need extensive computing power, patient data and other information are more likely to reside outside the relatively isolated healthcare data centre, probably on third party systems, which should raise concerns as AI is mostly in the domain of technology companies who may be innovative but may not be fully aware of the security aspects of health data as their ideas have moved from innovation to production.

AI in healthcare seeks to incorporate physical, digital and bio-technology data, to create services we can only dream of today. The rise of wearables and the availability of geolocation data through mobile phones means that it is easy to re-identify people from seemingly anonymised data and understand more of their behaviours, important information for population health, infectious disease control, behavioural health and chronic disease management, but the key is to not exploit personal data.

In addition, in the globalised worlds of data clouds, AI, and healthcare, the transfer of data across man made boundaries such as states and countries are both inevitable and necessary. The world is only just coming to terms with this but the way forward is being led by the UAE with the Fourth Industrial Revolution Protocol (4IR). This visionary protocol was signed at the World Economic Forum in Davos in 2018 and is a global roadmap that seeks to ensure the well-being of the community. Adopted by the UAE government, the protocol seeks to establish an integrated and secure data ecosystem to expedite the implementation of 4IR technologies to produce unprecedented services that can transform aspects of people's everyday life. Even when this protocol becomes a reality and is widely adopted, healthcare organisations must still protect themselves against ►

three major types of threats.

The first being the large-scale attack to get the data on as many patients as possible, for further sale or fraudulent enterprise. The second threat arises from headline grabbers, who want to attack high profile brands and famous facilities, probably for no financial gain, and the third is the targeted attack on one patient, say a celebrity or a high net worth individual for the purposes of selling the information to others such as gossip news or for blackmail purposes.

Traditional defensive methods are no longer sufficient to protect our patient's data from the bad guys as these types of attacks are becoming more and more sophisticated. There has been an increasing number of attacks using social engineering techniques (e.g. Phishing) that can overcome "traditional" defenses such as email filters, anti-virus, rule and signature-based detection systems. But before looking at what new AI based tools can do for organisations, I would like to suggest that these are only more sophisticated tools, and without the basics in place they will fail to deliver on their promises.

Good systems management is important. The focus should be on keeping not just the central servers up-to-date with security patches but also connected devices. To do this, assessments of suppliers' security policies and procedures should be a key part of your procurement department's process for selecting devices which may be attached to the system.

Information governance is key; defining critical data, knowing how the data is managed both in transit and at rest, and having defined, usable policies and processes, are much more important than adding more technology to a fractured system. Similarly, education and awareness are necessary so that everyone on the system is regularly made aware of these policies, not just on induction day. As threats are evolving, staff should be kept aware of the people side of security with ongoing campaigns such as anti-phishing behaviour management. However, all this is just guess work if you do not know how effective it all is and there needs to be regular penetration testing of the systems to ensure that you know your defenses are up to date and effective.

Doing all of this means there is a

shortage of security experts to help ensure that custody of your patients' data remains as effective as time moves on. This is where AI and machine learning can help healthcare cyber security. However, as mentioned previously, merely purchasing new tools does not improve defenses; they need to be deployed, maintained and monitored to provide effective defense.

Security Information and Event Management (SIEM) software products and services provide real-time analysis of security alerts generated by network hardware and applications and are also used to log security data and generate reports for compliance purposes. By combining this real-time data gathering with Threat Intelligence, extending the storage of this data over time and applying the enhanced analytics capabilities that come with machine learning and AI techniques, it improves the detection of attacks around the clock with less skilled staff. By looking at past performance, it becomes possible to analyse user and device behaviours to detect activity that is out of sync with the expected patterns from the devices or users much quicker and more accurately than human observers can. For example, if we unexpectedly start getting system access or requests for EMR data from unknown sources or many requests for a patient's data from multiple sources, this should raise a warning flag.

This use of AI in healthcare cyber security is becoming more and more important for protection of on-site systems especially as healthcare networks expand and data and processing gets pushed out into the "cloud". By the time we have fixed one vulnerability the bad guys have moved on and are attacking from a different direction. If we only rely on techniques that respond to existing attacks we will always be one step behind these bad guys. By using AI, we can be more proactive and start to be one step ahead, as we begin to detect abnormal behaviours as they happen. Then it becomes a bit like personal wellness where we identify people at risk of chronic disease and take preventative measures before it becomes a big problem. We can thus identify and stop the attacks before they snowball into a larger problem.



Jim Massey's principal areas of interest are Big Data Analysis and Machine Learning

The AI-based tools are getting better all the time and we will see them continue to evolve and learn over the course of the next few years, so that the anticipation of attacks will be quicker and the responses stronger. The healthcare industry has been slow to react to the realisation of how valuable their data is, and we are playing catch with other industries. It does give us the opportunity to look at them and quickly match the bad guys by learning from other industries. AI and machine learning will offer healthcare organisations a way of securing their patients' data as healthcare evolves without relying on scarce high-cost skills but will only meet its promise if the basics of information governance, awareness and education are in place first.

The application of AI in healthcare is a double-edged sword. By its very nature of openness and sharing of data to be effective it exposes us to potential new vulnerabilities while the use of AI in cyber security tools improves our ability to identify and respond to threats. The current burden is falling on individual organisations, leaving weaknesses in the whole system. As the use of big data, AI and machine learning become more collaborative and international, to safely realise their potential we will need the UAE's initiative in establishing the 4IR protocol to ensure the Arab world is at the forefront of this change. **AH**

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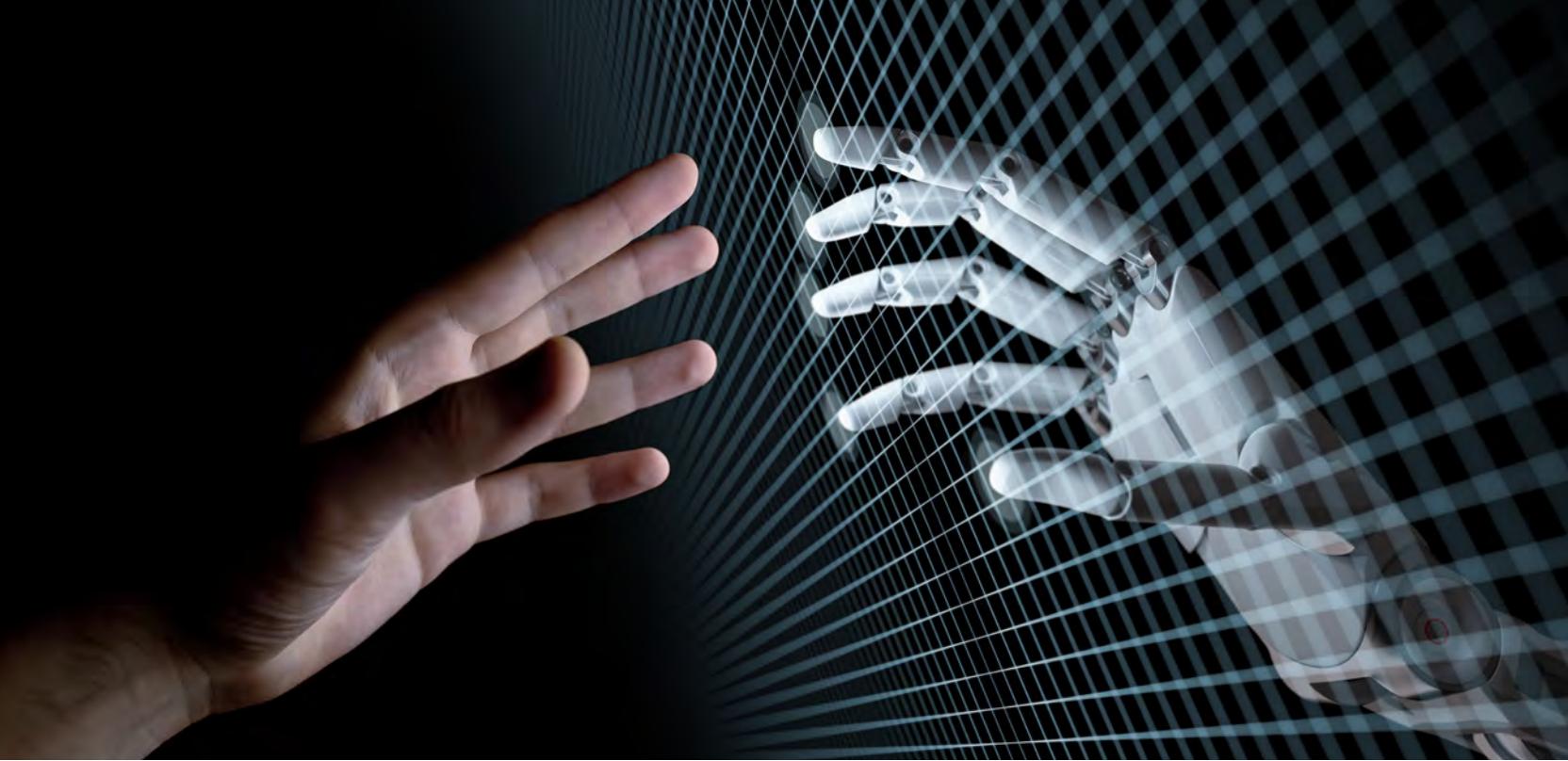
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THE NEW PENICILLIN

Improving Patient Outcomes with AI and Advanced Analytics

By Christian Putz, Director, Emerging, EMEA, Pure Storage

Across the globe, healthcare providers are facing the same three questions. How do we improve patient care? With growing populations, how can we help more people? And how can this be achieved with budgets that have been under pressure?

Finding a solution to these questions is increasingly reliant on technology. Now the good news for healthcare providers in the Middle East is that based on findings from a recent survey, analysts at PwC believe that the region is positioned to be a first-mover when it comes to adopting technology to improve patient care. However, the responsibility of addressing these issues and ensuring that technology can deliver on these promises, is falling to the IT department within healthcare institutions. Once focused solely on 'keeping the lights on', IT has evolved to become a strategic element within healthcare, much like it already has in other consumer focused sectors like retail and hospitality. It's now a team focused on helping to reduce costs, on making more resources available for medical professionals

and on making medical innovation a reality within the organisation.

It's always been the case that by understanding more about a patient, doctors can more accurately diagnose an issue. Now medical professionals can use data in addition to their patients' concerns to help them better understand symptoms. Everything from medical phone apps to new imaging technology is providing reams of data to support diagnosis. For example, by combining information on a patient's lifestyle with data on their DNA structure, hereditary abnormalities in the family and heart rate and blood pressure, steps can be taken to prevent certain illnesses altogether or help doctors prescribe medication or lifestyle changes that are precisely and fully focused on the physiology of that single patient. These new innovations, and the data they generate, are increasingly helping medical professionals deliver significantly improved patient outcomes.

However, enabling all of this data to be accessed in the right time, in the right place and in the right format is a significant IT

challenge. Estimates suggest that the vast majority of all data in an organisation is unstructured. To enable healthcare providers to benefit from this data, IT is increasingly looking towards advanced real-time analytics and 'deep learning' using advanced technologies, such as artificial intelligence (AI) and machine learning, to support the processing and delivery of data.

There's no doubt that these technologies provide incredible advantages across a wide range of industries. In healthcare, the application of real-time analytics can help to detect and diagnose diseases faster, reduce time-to-treatment, lower costs and eventually lead to better patient care and outcomes.

We've seen the potential impact of this with the AMPLab at UC Berkeley, which developed a real-time analytics engine to analyse genetic make-up. This analysis allows doctors to deliver medicine which is more precisely tailored towards each patient. By combining this engine with flash storage, the Lab has also significantly reduced the time needed to

sequence data-intensive DNA samples and analyse results. As a result, researchers and clinicians can generate valuable new insights and, in some cases, deliver faster answers to life-and-death questions.

But implementing advanced real-time analytics or an AI project isn't that simple. Huge amounts of data need to be processed and analysed at speed, in order to make the split-second decisions that the technology is capable of. As a result, these projects need a very solid infrastructure and significant compute power to work effectively.

Traditional data centres for healthcare organisations have done reasonably well in terms of enabling healthcare practitioners to deliver patient care. But they were never built with the intention of running the demanding data applications now being used. The future with these applications, AI and machine learning, requires a different approach to data centre infrastructure—an approach with a particular focus on storage, designed to deliver massively-parallel access to data at a very high bandwidth.

But here's the dilemma, how do healthcare organisations do this while

dealing with constrained budgets? The answer lies in flash. An all-flash data platform, purpose-built for modern analytics and deep learning can enable healthcare organisations to realise the potential of AI faster and on a far smaller footprint than traditional infrastructure for high-performance computing would provide.

According to the PwC research I cited earlier, 33% of Middle East respondents believe that advanced computers/robots, coupled with AI can make a diagnosis faster and more accurately and 29% believe that it will help make better treatment recommendations. However, for this to be a reality, healthcare providers, in the region, today require a data platform that enables them to deploy a new class of applications, to extract new insights from data and to do so in real-time.

By ensuring innovations like AI and advanced analytics are supported from the data centre level up, they should be able to run operations with cloud-like agility, improve the economics of data analytics at high velocity and scale, and derive new insights to deliver data-driven patient outcomes

and results not possible before. Ultimately, by transforming how the organisation can handle and process data, IT teams will enable practitioners to deliver the best level of integrated care possible, to more people. **AH**



As the regional director for Eastern Europe, Russia, Middle East and Turkey, Christian Putz is responsible for accelerating the company's growth in the region.

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Managing a Hospital is NO CHILD'S PLAY

By Vivek Shukla, Director, Healthcare & Lifesciences, Frost & Sullivan

When Peter Drucker remarked, "Hospital is perhaps the most complicated enterprise ever created by mankind" – he couldn't have been more correct. There are other businesses and there is healthcare delivery. Nowhere are the stakes as high in terms of human life and emotions as in healthcare services. The psychological association with hospitals is seldom a positive one as they are associated with pain, sorrow and sometimes even death.

Governments and administrations are breaking their heads to solve the conundrums presented by the healthcare delivery system. Elections in many countries across the world have healthcare as one of the crucial agenda items.

The complexities in the business are many and growing with each passing day. Given below are some factors that make healthcare delivery a complicated business to be in:

No one is unilaterally responsible for consumer experience:

Everyone plays a part in serving the customer and one cannot pin point as to who is actually responsible for the over-all service delivery. For example, a surgeon would like to think that if the surgery was done well and was uneventful then the patient has received what he came for. However, the overall patient experience consists of a lot of other elements like the quality of food, nursing care, discharge process, etc over which the surgeon has no direct control. Each stakeholder in the care cycle can only do her or his part and

is not in a position to influence the overall experience of the patient.

One bad moment at any of the numerous 'touch-points' will cast a shadow on the good work done by others. Unlike a restaurant or air-travel, which has fewer touch-points, a patient will visit the parking attendant, the reception desk, doctors, laboratory, radio-diagnostics, canteen and pharmacy in one visit.

To make matters worse, the management control is limited to the service delivery. The people who run and manage hospitals are usually dependent on these numerous departments to deliver the desired experience and results. This adds to the complexity.

Consumers are not equipped to judge the quality of service being provided:

How will a patient know during and after the surgery that the theatre in-charge had sterilised one instrument less for the surgery? As a result, the surgeon was not able to give his 100% skill to the surgery. How will an OPD patient come to know that if the doctor had prescribed another antibiotic, it would have been better for him?

Consumers judge the service quality through a very limited perspective. Mostly, the judgement is limited to the elements that a patient can either see, touch or feel. For instance, the ambience, the body language of the staff, the tone of voice used by the front office, will be the parameters for a patient to judge the quality of care being provided by a hospital.

Cold food served to a patient will sometimes outweigh the precision with

which the surgery is done. The pain of bad service often outlives the post-operative surgery pain in the long run only because the patient cannot really assess the surgeon's precision. An accurate diagnosis of a rare medical condition gets overlooked (even if temporarily), if the receptionist did not smile to the liking of the patient. The tangible factors tend to outweigh the non-tangible ones because the patients are not technologically equipped to evaluate the latter.

Healthcare delivery is a service that no one wants to buy:

Going to a hospital is not akin to going on a vacation or buying a new car. No one is looking forward to his or her next surgery. People go to the hospital not out of willingness but out of necessity. The tricky question for private healthcare providers is – 'How do you make them willing to buy from you?' The services of a private hospital are for general good of human beings and yet they are paid for. So, it becomes a complex contradiction when your objective is to make everyone healthy and yet you want people to come to you in sickness. Healthcare is one of the trickiest services to market.

The management of large variety of workforce makes things intricate:

From a highly-skilled neuro surgeon to a janitor, the cross-section of the work force in a hospital is huge. Unlike a software company or a law firm, where everyone is at a similar level in terms of skill and education, hospitals have a huge variety of workforce. The biggest challenge is to integrate the diversity and



urge every member of the myriad workforce to work towards a common goal of customer satisfaction. The system has to work like a well-oiled machine in spite of all variance, which is not an easy thing to ensure.

Decider, user and payer may not be the same people:

Consider this – An old man going for his prostate surgery may not be paying for it himself. His son may pay for it. However, the son is not the one who decides which hospital the old man will go to. That decision may be taken by the wife of the gentleman. Now put the insurance and third-party administrators (TPAs) in the picture, which pay up for many patients that a hospital treats today. In short, multiple people may be involved in the decision making and paying process and none of these people may be using the service. Sometimes, the ones paying for the treatment would not even know the patient personally. The hospital will get paid for the services rendered today after a few weeks. The system for claiming this payment involves complex data entry and coding. Sometimes, the hospital will not be paid the complete amount as there will be deductions from the insurance companies. This ends up in payor, provider and patient competing with each other to shift the burden of the cost on each other. Complex indeed!

Working capital is a perpetual challenge:

The expenses of a hospital happen before

the hospital earns money. Salaries, electricity bills and other overheads are to be dispensed within “this month”. A big chunk of money nowadays comes after a couple of months or more. How does a hospital meet its day-to-day expenses? Working capital is something that hospitals have to keep a close watch on all the time. Another complicated twist to an already complicated scenario!

Technology keeps changing every passing year:

Equipment is expensive. Moreover, it gets upgraded before you have learnt how to use the existing version fully. Even if a cash-stripped hospital does not want to buy the new ‘white elephant’, it is forced to. The competitor may somehow manage to buy the new version and the hospital may lose out on the market share. Buying upgraded equipment even when you don’t need it sometimes becomes a necessary evil in order to survive the competition. Additionally, some equipment are an absolute must in order to complement the existing services. For example, a hospital may have to install an expensive MRI machine if it wants to hire and retain good neurologists.

It is both a labour and capital-intensive business:

Most businesses are either dependent on manpower or money. Healthcare delivery is dependent on both. It requires a huge amount of investment and a high number of skilled staff to set up hospitals and maintain them. The global shortage of

skilled professionals is another challenge the business has to deal with. The demand for doctors and nursing staff is far more than the supply. Most countries have their independent systems to qualify and license doctors in order to allow them to practice. This sometimes deters medical professionals to relocate themselves to other countries.

In Summary:

The business of healthcare is evolving with every passing day. Healthcare providers are learning to cope with these complexities. The riddles may never be cracked fully, but incremental progress is being made. The pace of learning will perhaps determine which player will survive in the long term. What is required of the hospital promoters is their need to widen the horizons and question the norms all the time. **AH**



Vivek Shukla, Director, Healthcare & Lifesciences, Frost & Sullivan

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New KUGEL medical solutions @Africa Health 2018: BASIC line

KUGEL medical has designed a BASIC line that aims to improve medical diagnostics, standards and treatments in Africa and other continents. To learn more about the BASIC line and histo-pathology equipment, visit KUGEL medical at booth No. 2H17 in Hall 2!

Article provided by KUGEL medical

KUGEL medical is one of the worldwide leading suppliers of high-quality products and equipment for pathologies and histologies. For 20 years, the company has been supplying pathological, histological and cytological institutes, universities, hospitals, funeral parlors, pharmacy companies, governmental institutions as well as forensic institutes with its state-of-the-art solutions. Its long years of experience have enabled KUGEL medical to create numerous standardized solutions

with a lot of individual details, true to its motto "WE CREATE SOLUTIONS".

The BASIC line includes anatomy and autopsy tables for medical education at universities, grossing tables for any kind of diagnostic work in the fields of pathology and histology as well as morgue refrigeration units for tropical environments and lift and transport trucks for deceased.

"The BASIC line is characterized by easy and reliable solutions at economic prices without impairing the typical KUGEL medical quality Made In Germany that we are known for



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around the world. All of our solutions are made of stainless steel due to the fact that it is sturdy, durable and easy to keep sterile. Independently of a particular product line, all of our solutions distinguish themselves by their ease of use, high reliability and the fact that they are virtually maintenance-free," explains Robert Karl, CEO at KUGEL medical.

Visit us at our booth no. 2H17 in hall 2 and learn more about our BASIC line and our histo-pathology equipment in general. We look forward to welcoming you at our booth!

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Ospedale San Raffaele is a **clinical-research-university hospital part of Gruppo ospedaliero San Donato**, the leading hospital group in Italy. It has **more than 50 clinical specialties** and over 1,300 beds, and its emergency department counts 67,000 annual accesses. Research at Ospedale San Raffaele focuses on integrating basic, translational and clinical activities to provide the most advanced treatments to patients. The hospital counts on over 1,800 medical doctors, scientists and technicians and on state-of-the-art facilities and technology platforms. Ospedale San Raffaele is recognized as a **global authority in molecular medicine and gene therapy**, and is at the forefront of research in many other fields, standing out for the **deep interaction between clinical and scientific area** – this makes the transfer of scientific results from the laboratories to the patient's bed easier. Its mission is to improve knowledge of diseases, identify new therapies and encourage young scientists and doctors to grow professionally.

Ospedale San Raffaele is among the few centers in the world which **perform pancreatic islet transplantation** (i.e. the cells in the pancreas that produce insulin) to treat type 1 diabetes patients who do not respond to conventional therapies. The transplant aims at recreating the function of insulin-producing cells in a host organ (e.g. the liver). This technique has made huge progress along the years, but it still has some limits, involving immunosuppressive regimens and rejection risks like all transplants. Our researchers at **San Raffaele Diabetes**

Research Institute (DRI) are currently studying new treatment perspectives using stem cells, differentiating insulin-producing from pluripotent stem cells. In the future, this may allow to rely on an endless source of cells that produce insulin and to modify such cells so that the immune system does not recognize and attack them.

Our research stands out to find **treatments for genetic blood diseases**, too. Our Hematology and bone marrow transplantation unit works side by side with the San Raffaele Telethon Institute for Gene Therapy (SR-Tiget) to **find a cure to thalassemia major**, the most serious form of the disease, causing chronic anemia and provoked by a defect in the production of hemoglobin. At the time being, conventional treatment consists in regular transfusions of red blood cells associated to iron chelation therapy. Patients who can rely on a bone marrow donor and are in good condition can undergo transplantation – that is currently the unique curative therapy. Our doctors and researchers are trying to **set up a treatment to correct the defective gene causing the disease** – first, stem cells are extracted from the blood of the patient, then they are provided with the corrected gene and infused back into the patient's bone marrow. The healthy gene is carried into the cells by a genetically engineered virus which is modified so it becomes harmless. Once corrected stem cells are in the bone marrow, they start producing healthy and functional red blood cells. The treatment is currently an experimental protocol involving ten patients which showed encouraging preliminary results.

Masimo Announces UniView™

UniView Aggregates and Displays Patient Data from Multiple Devices to Minimize Clinician Cognitive Overload and Maximize Patient Safety

Masimo (NASDAQ: MASI) has announced the release of UniView™, an integrated display of real-time data and alarms from multiple Masimo and third-party devices, designed to reduce clinician cognitive overload and improve patient safety. UniView promotes data sharing and team coordination among multiple clinicians.

In operating rooms (ORs), in intensive care units (ICUs), and in other areas which involve multiple clinical disciplines, clinicians are often unable to simultaneously view data from all of the various medical devices in use, resulting in information that remains siloed among, for example, anesthesiologists, surgeons, and nurses. In addition, the plethora of displays and user interfaces adds to cognitive overload that can cause clinician burnout and suboptimal patient care.

UniView solves these problems by bringing together data from a variety of sources – such as patient monitors, ventilators, anesthesia gas machines, and IV pumps – and providing a supplementary display for them, clearly organized, on one or more large, central monitors, so that all clinicians can simultaneously view and act upon the same, comprehensive real-time patient status and historical trends. Visual alarm indicators, relayed from the connected devices, help clinicians recognize patient distress and target areas for immediate focus. UniView is suitable for any area where comprehensive, logically organized, and timely data are key to supporting good clinical care.

UniView also provides tailored, use-case-specific screen layouts which optimize the presentation of advanced and integrated parameters, trend data, and waveforms for a variety of clinical scenarios, making it a versatile solution in many environments. For example:

1. In **Overview** layout, view monitoring data from all connected point-of-care and therapeutic devices including waveforms and alarms, for an overview of patient status.

2. In **Hemodynamics** layout, view trend data for noninvasive hemoglobin (SpHb®), pleth variability index (PVi®), and pulse rate to aid in visualizing patient status over time.



3. In **Oxygenation** layout, view ventilator waveforms alongside noninvasive trended hemoglobin (SpHb) and oxygen saturation (SpO2) to monitor a patient's oxygenation status.

4. In **Sedation** layout, view high-fidelity EEG waveforms, patient state index (PSi), and anesthesia machine data to monitor a patient's sedation.

In addition, hospitals will be able to customize the view as preferred and even take advantage of individual customization using Masimo MyView™ technology.

Joe Kiani, Founder and CEO of Masimo, said, "We are answering clinicians' calls for logical, clinically transformational cockpits for the collaborative ORs and ICUs of the future. UniView is a great example of Masimo's ongoing commitment to automating patient care, whether it's making pulse oximeters accurate when you need that accuracy most, creating new noninvasive monitoring technologies such as SpHb, or in this case, unisiloing data, enhancing connectivity, and communicating patient data as effectively and efficiently as possible, so that clinicians can focus more on their patients. We look forward to introducing additional enhancements soon – helping to bring automation and connectivity to the next level."

UniView builds on the success of Kite™, which projects data from Root® on a larger screen, by aggregating data from all of the connected devices in a room, including third-party ones, so that a supplemental display of all monitoring data can be viewed by all. UniView works in conjunction with Masimo Iris Gateway™ and Patient SafetyNet™* connectivity platforms. Complementing UniView, the recently announced Masimo

Overview Layout



Adaptable layout automatically reconfigures based on connected devices to optimize the view of parameter data, including waveforms and alarms, for an overview of patient status

Haemodynamics Layout



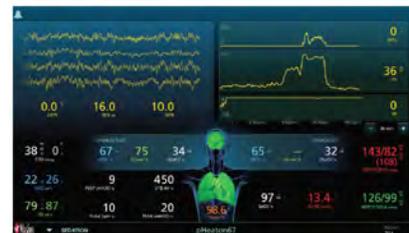
View trend data for noninvasive haemoglobin (SpHb®), pleth variability index (PVi®), and pulse rate (PR) to aid in visualising a patient's status over time

Oxygenation Layout



View ventilator waveforms alongside noninvasive trended haemoglobin (SpHb) and oxygen saturation (SpO2) to monitor a patient's oxygenation status

Sedation Layout



View high-fidelity EEG waveforms, patient state index (PSi), and anaesthesia machine data to monitor a patient's depth of anaesthesia

Replica™ allows clinicians to view similar monitoring data for multiple patients, as well as view and respond to alarms and alerts, all from a smart phone, regardless of location.

Cleveland Clinic Abu Dhabi Establishes UAE's First Comprehensive Multi-Organ Transplant Program

Completed full liver and lung transplants in 2018, following earlier heart and kidney transplants

Article Provided by Cleveland Clinic

Physicians at Cleveland Clinic Abu Dhabi have created history in the UAE by developing a comprehensive multi-organ transplant program which is already transforming patients' lives.

In February, the multispecialty hospital successfully completed the United Arab Emirates' first full liver transplant and first lung transplant, both from deceased donors.

Following the pioneering surgeries, which took place on February 1 and February 11, Cleveland Clinic Abu Dhabi has now performed deceased donor transplants for four major organs – kidney, heart, liver and lung.

The UAE's first full liver transplant, which took place on February 1, was performed by a five-person medical and surgical team led by Antonio Pinna, MD, transplant surgeon at Cleveland Clinic Abu Dhabi. The UAE's first deceased donor lung transplant, which took place on February 11, was led by Redha Souilamas, MD, Chief of Thoracic Surgery at Cleveland Clinic Abu Dhabi.

In December 2017, surgeons at Cleveland Clinic Abu Dhabi performed the UAE's first full heart transplant, while a team from the hospital successfully conducted one of the UAE's first kidney transplants from a deceased donor in September 2017.

Cleveland Clinic Abu Dhabi is currently the UAE's first and only multi-organ transplant facility, following the UAE government decree last year allowing deceased donor transplants.

Sheikh Abdullah bin Mohammed Al Hamed, Chairman of the Department of Health, says: "We are immensely proud to achieve these new medical milestones in the UAE. Coming only weeks after Cleveland Clinic Abu Dhabi completed the UAE's first full heart transplant, this progress shows just how



far the UAE has come in providing advanced medical services which enable patients to receive the very best care at home."

"Our next step has to be supporting a robust culture of organ donation to make it easy for people to gift their organs. We are seeing the incredible impact that organ donation is having on multiple lives within the UAE, and are receiving regular inquiries from people looking to donate, so will work with our partners to make the process easier and more accessible," he adds.

The operations were also supported by the UAE's Ministry of Health.

Cleveland Clinic Abu Dhabi, part of Mubadala's network of healthcare providers, has worked closely with the Cleveland Clinic Transplant Center in the US, a world leader in organ transplantation; partner hospitals in the UAE; and the Saudi Center for Organ Transplant in establishing its organ transplant program. The transplant program has also benefitted from continued collaboration with Abu Dhabi Police and a number of other government entities. By cooperating with multiple facilities across the region, experts are optimistic that a wider pool of potential

donors can be engaged and transplants can be conducted more rapidly for the seriously ill.

Waleed Al Mokarrab Al Muhairi, Chairman of Cleveland Clinic Abu Dhabi, Mubadala's Deputy Group CEO, and Chief Executive Officer, Alternative Investments & Infrastructure, says: "These historic surgeries are the product of ongoing and established cooperation between a number of UAE, regional and global entities. They involved physicians from Abu Dhabi, Ajman and Fujairah as well as transportation from the National Transplant Committee and liaison and expert advice from Cleveland Clinic Transplant Center in the United States."

Ali Abdul Kareem Al Obaidli, MD, Chair of the National Transplant Committee, says: "There is growing public support for organ donation in the UAE, and this is not surprising because the UAE has a historic culture of donation in general. We are currently working on plans to extend this effort further through a community outreach program. Already, we have been contacted by many people who have expressed an interest in donating their organs after they die and we would like to open a UAE donor registry to the public in the near future."

"We are very proud that Cleveland Clinic Abu Dhabi is the first and only multi-organ transplant facility in the country," says Rakesh Suri, MD, D Phil, CEO of Cleveland Clinic Abu Dhabi. "The hospital is pleased to be able to repay just a small amount of the trust placed in us by the people of Abu Dhabi by ensuring that some of the sickest patients we treat are now able to receive cutting-edge surgical and medical treatment without traveling abroad."

For more information, please visit www.clevelandclinicabudhabi.ae

Brain Stroke: A stitch in time

Article provided by RAK Hospital

If we were to look around, there's a likely chance that we will find at least one person who has either suffered from brain stroke or knows someone who has. This alarming prevalence of the dangerous condition needs to be addressed as seriously as we would address cancer or cardiac arrest. In the UAE, brain stroke is the second biggest cause of disability, and as per a recent news report, around 10,000 patients suffer from stroke annually, which takes the average to one stroke an hour. Just as alarming is the fact that around half of these cases happen to people under the age of 50, a sharp contrast from the global statistics where 80 percent of the stroke patients are above the age of 65. It is also the third leading cause of death globally.

These statistics call for an urgent need to create awareness regarding the causes behind brain stroke – essentially an unhealthy diet and sleep pattern and a sedentary lifestyle. The key factors contributing to strokes due to clots (also called as ischemic strokes) in UAE are hypertension, diabetes, smoking, obesity and coronary heart diseases. A less prevalent type is called hemorrhagic stroke which is a result of a ruptured artery in brain, causing bleeding and brain damage. People should also be aware of Transient Ischemic attack (TIA) or 'mini-stroke'. This occurs when a blood clot blocks an artery to brain for a short while, causing temporary paralysis or numbness of the arm/leg/face and lasts for a few minutes before going back to normal. This is serious and needs to be attended to urgently as it can be a harbinger of a big stroke soon.

However, it is just as important, if not more to educate people on recognizing symptoms of a stroke and get help. In this regard, the easiest way is to remember the acronym BEFAST: loss of balance, eye or vision, face deviation, arm weakness and speech trouble. Another telling sign is severe headache for no evident reason.



*Dr Sweta Aditya,
Specialist Neurologist*

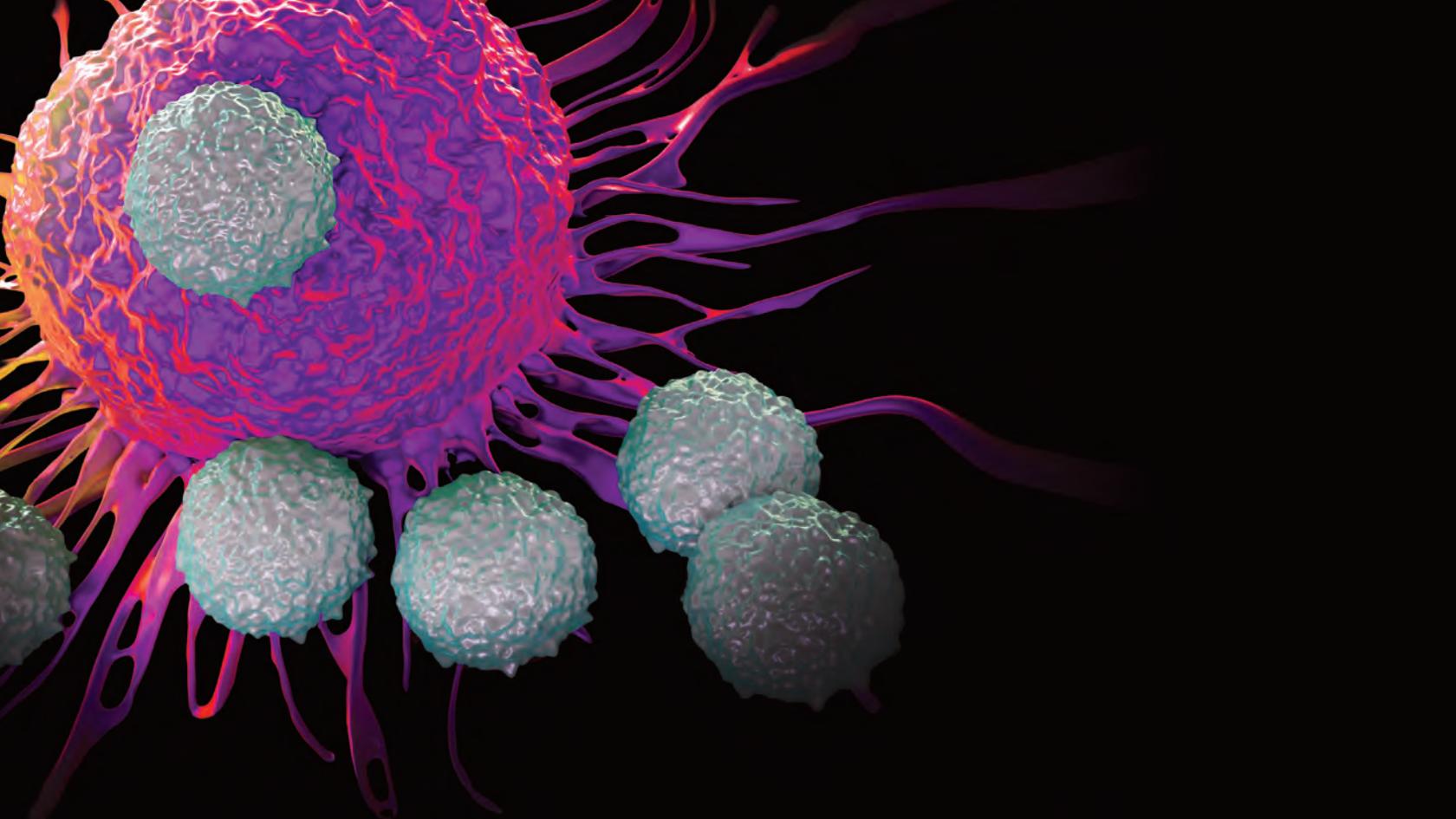


*Dr Tinku Jose Kurisinkal,
Consultant Neurosurgery*

Strokes occur suddenly and the damage in the brain takes place very quickly, and the longer it takes a person to get medical assistance, the more the ensuing brain damage. The awareness and presence of mind to act in a situation when a near one is suffering from stroke symptoms is the first step to saving life. The call for immediate medical help in such a situation cannot be stressed enough since every hour makes a difference. The patient showing any of the symptoms should be rushed to a hospital capable of assessing, diagnosing and treating such strokes, for CT scan and to administer a clot busting therapy or drug called TPA (thrombolytic drug). This is the only approved treatment in cases of acute blockage of blood/oxygen, or a ruptured blood vessel. However, even this treatment can be only done within four-and-a-half hours of onset of the symptoms.

The Neuroscience Department at RAK Hospital, with its state-of-the-art medical facilities is well-equipped to deal with any stroke emergencies. With a team of skilled medical staff led by Dr Tinku Jose Kurisinkal, Consultant Neurosurgery and Dr Sweta Aditya, Specialist Neurologist, it offers a 24x7 acute stroke unit to administer TPA injection as well as surgical therapy in case of hemorrhagic stroke or bleeding. Besides this, the department excels in comprehensive management of head and spinal cord injuries, total disc replacement and fusion, treatment of multiple sclerosis and epilepsy diagnosis and treatment, movement disorders, spinal diseases and metabolic neurological diseases, among others.

For more information, please visit www.rakhospital.com



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