



Vol. 05, Issue 02, No. 26, March-April 2021

# MEDIWORLD

## Middle East



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PO Box: 9604, SAIF Zone, Sharjah - UAE  
Tel: +971 6 557 9579, Fax: +971 6 579569,  
info@7dimensionsmedia.com  
www.7dimensionsmedia.com

### Chief Editor

Rustu Soyden  
rustu@mediworldme.com

### Editor

Ayesha Rashid  
ayesha@7dimensionsmedia.com

### Contributors

Nirmala Rao

### Sales & Marketing

Israr Ahamed  
israr@7dimensionsmedia.com

Tousif Ahmed  
tousif@7dimensionsmedia.com

### Head Operations

Mohammad Karimulla  
karimulla@7dimensionsmedia.com

### Creative Director

Mohammed Imran  
imran@7dimensionsmedia.com

### Photo Journalist

Wasim Ahmed  
wasim@7dimensionsmedia.com

### World wide Media Representatives

France, Belgium, Monaco, Spain: Aidmedia, Gerard Lecoer;  
Tel: +33(0) 466 326 106; Fax: +33 (0) 466 327 073  
India: RMA Mesia, Fareedoon Kuka;  
Tel: +91 22 55 70 30 81; Fax: +91 22 5570 3082  
Taiwan: Advance Media Services Ltd, Keith Lee;  
Tel: (886) 2 2523 8268; Fax: (886) 2 2521 4456  
Thailand: Trade and Logistics Siam Ltd, Dwighr A chivetta;  
Tel: +66 (0) 2650 8690; Fax: +66 (0) 2650 8696  
UK, Ireland, Germany, Switzerland, Austria: Horseshoe Media,  
Peter Patterson;  
Tel: +44 208 6874 160

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## Editorial

### What's becoming a standard part of our lives?

Wearable technologies have become a standard part of our lives. A recent report from Research and Markets predicts global sales of wearable devices to exceed \$60 billion by 2025.

Widely available and often inexpensive, the tools are finding a role among physicians and in many elements of care delivery. Wearable accelerometers, which measure acceleration forces and are commonly found in consumer smartwatches, offer a more reliable measure of physical activity than self-reporting, a recent study by Johns Hopkins Medicine researchers finds.

Personalized data generated from wearables is empowering doctors to make more informed care decisions with new insights that extend far beyond a patient's level of physical activity. The latest wearable tools can monitor everything from a patient's blood pressure to his or her oxygen saturation, offering physician's unique ways of keeping tabs on their patients from afar.

Fitbit Sense is the advanced health smartwatch that helps you tune in to your body with tools for stress management, heart health, SpO2, skin temperature & more. Prateek Kewalramani, Senior Manager of Middle East & Africa at Fitbit tells us how their new smart watch Sense is an advanced health smartwatch that helps us tune in to our body with tools for stress management? Plus, we also pin down our honest review of the watch as well at the end of the article!

Digital microscopy is one of the buzz words in microscopy – and there are a couple of facts that are useful to know. They are also known as ideal instruments for analysis and documentation of parts and samples during research and development (R&D), manufacturing and inspection, quality control and assurance (QC/QA), as well as failure analysis (FA). Midipath aims to design and develop a set of new digital tools, helping anatomical pathologists refine very serious diseases diagnosis, such as cancers. The tools are specifically designed for the detection of rare elements. Marine Malbert, Responsible RH & Communication at Epineest tell us in detail the purpose of MiDiPATH project in an email interview.

Economic development and universal health coverage through national health insurance has led to a rapid improvement in health outcomes in Korea. Overall, the health status of the Korean population is better than that of many other Asian countries. We explore South Korea in our medical destination.

As always we are open for your feedback, and if you would like to be featured in our magazine you can get in touch with me at ayesha@mediworldme.com. We are also spread across social media (Facebook, Twitter, LinkedIn and Instagram) so be sure to LIKE and FOLLOW us there as well.

Sincerely,

**Ayesha Rashid**  
**Editor, MediWorld ME**





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# World's first EDA sensor smartwatch

The new EDA sensor on Sense measures electrodermal activity responses. Measuring your EDA responses can help you understand your body's response to stressors and help you manage your stress. You can do a quick EDA Scan session on device to see your responses, or pair it with guided mindfulness sessions in the Fitbit app to see how your body responds during meditation or relaxation



he impact of the COVID-19 pandemic is drastically changing the lives of people, including the lives of young people, students, kids and so on. Schools and universities have now turned to half/full distant learning which is a hectic process for every work from home parent nonetheless. Exams and events postponed, the usual health information services are limited, socializing with friends and wider family is highly discouraged and in some places even punishable. Living in these circumstances can be

tough for us and for our social, physical and mental wellbeing.

Stress is a nearly universal experience, with more than one-third of people across the globe reporting physical and mental side effects of stress. Over time, the physical strain from stress if unmanaged can lead to negative health effects ranging from headaches to an increased risk of cardiac disease, to obesity and depression. The management of stress is important for creating a balance in life. According to the latest Fitbit survey, 92% of those surveyed felt that their stress levels have an impact on their overall personal health and 60% stated that their stress levels have been heightened due to COVID-19, affecting things such as mood and sleep. The availability of tools to manage stress is important to bring the change in life, an opportunity to work towards improving our overall wellbeing. These opportunities can help us form new habits and reset our priorities.

The global stress management treatments market should reach \$20.6 billion by 2024 from \$17.2 billion in 2019 at a compound annual growth rate (CAGR) of 3.7% for the forecast period of 2019 to 2024, according to BCC Research.

Prateek Kewalramani, Senior Manager of Middle East & Africa at Fitbit explains to Ayesha Rashid from Mediworldme how their new smart watch fitbit sense is an advanced health smartwatch that helps us tune in to our body with tools for stress management?

### ***Tell us in detail about your Fitbit Sense?***

Fitbit Sense is the most advanced health smartwatch, bringing innovative sensor and software technology with the world's first electrodermal activity (EDA) sensor on a smartwatch to help manage stress, along with advanced heart rate tracking technology, Stress Management Score and an on-wrist skin temperature sensor, all powered by 6+ days' battery life. The device comes with a free six-month trial of Fitbit Premium, it can help you track key trends in your health and wellbeing, like heart rate variability (HRV), breathing rate, and SpO2 with the new Health Metrics dashboard.

### ***How does the EDA sensor work on the watch?***

The new EDA sensor on Fitbit Sense measures electrodermal activity responses. Using the EDA Scan app, place your palm over the face of the device to detect small electrical changes in the sweat level of your skin. Measuring your EDA responses can help you understand your body's response to stressors and help you manage your stress. You can do a quick EDA Scan session on device to see your responses, or pair it with guided mindfulness sessions in the Fitbit app to see how your body responds during meditation or relaxation. At the end of your session, you will see an EDA response graph on-device and in the mobile app to gauge your progress over time and reflect on how you feel emotionally.

Fitbit's new Stress Management Score calculates how your body is responding to stress based on your heart rate, sleep, and activity level data. Available with Fitbit Sense, it can be found in the new stress management tile in the Fitbit app. Ranging from 1-100, with a higher score indicating your body is showing fewer physical signs of stress, the score is coupled with recommendations to better manage stress, like breathing exercises and other mindfulness tools. Fitbit Premium members will get a detailed breakdown on how the score is calculated,



*The global stress management treatments market should reach \$20.6 billion by 2024 from \$17.2 billion in 2019 at a compound annual growth rate (CAGR) of 3.7% for the forecast period of 2019 to 2024, according to BCC Research.*



**Prateek Kewalramani**  
Senior Manager of  
Middle East & Africa  
at Fitbit



which consists of over 10 biometric inputs, including exertion balance (impact of activity), responsiveness (heart rate, heart rate variability and electrodermal activity from the EDA Scan app), and sleep patterns (sleep quality).

### ***Describe its Health Metrics dashboard?***

The Health Metrics dashboard, a new tool on the Fitbit app helps you keep a closer eye on your health and wellbeing. The dashboard provides access to track metrics like heart rate variability, breathing rate, oxygen saturation (SpO2), and skin temperature variation. Fitbit Sense, Fitbit Versa 3, Fitbit Versa 2, Fitbit Inspire 2 and Fitbit Charge 4 users are able to see their 7-day trends for free, while all Premium members with compatible devices can use the tool to track their 7-day and 30-day trends and personal ranges for each metric.

### ***While innovation might be to blame for some extra anxiety in our lives, how can we certainly turn tables on it and use Fitbit Sense to our advantage?***

Our commitment to innovation means that we are continually researching how we can make data about our health and fitness both more accessible and more actionable. Over the years, we've worked to make health more accessible, fun and achievable by offering a range of affordable, cross-platform devices so you can choose what works best for you; and for those looking for extra support and motivation, Fitbit Premium provides even greater value to what it means to be "on Fitbit" by delivering more personalized guidance, content and actionable insights. We have one of the largest databases of activity, exercise and sleep, which we use to inform new and existing algorithms and to shape new features and experiences.

Talking about stress, it has become a global issue, with one in three people experiencing a lot of worry or stress, as well as psychological and physiological symptoms caused by stress. Over time, the physical strain from stress can contribute to a variety of health problems if unmanaged, like an increased risk for high blood pressure and heart disease, obesity, diabetes, and mental health disorders like anxiety or depression.

Talking about anxiety, signing up for mindfulness sessions and starting low- to moderate-intensity exercise three times a week eases anxiety. The combined on-device and in-app experience with Fitbit Sense gives you insights into your body's response to stress with tools to help you manage both your physical and mental stress. These tools guide with solutions which are more impactful and sustainable.

### ***Where does Fitbit come in the picture in the science of stress and its relationship to technology?***

At Fitbit, we believe health belongs to everyone. Our mission is to make everyone in the world healthier. With stress being a major health concern and nearly a universal experience, it has now become more important than ever to focus on overall health than just being physically fit. Stress is now one of the most important parts of our holistic approach to health and wellness. The Fitbit's team of behavioral health experts successfully managed to equip Fitbit Sense with EDA scan app and Stress Management Score to provide a combined on-



device and in-app experience to the Fitbit users which can help manage both your physical and mental stress. Thanks to our behavioral health experts, with their decades of expertise in diagnosing and treating mental health, along with guidance from medical experts at leading academic institutions, Fitbit was able to bring the most advanced health smartwatch- Fitbit Sense which is helping users better understand and manage their stress and heart health.

### ***How does Fitbit make routines and improve productivity?***

With the introduction of Fitbit Premium, we started providing even greater value to what it means to be "on Fitbit" by delivering more personalized guidance, content and actionable insights. We have one of the largest databases of activity, exercise and sleep, which we use to inform new and existing algorithms and to shape new features and experiences. Delivering dynamic and personalized experiences motivates the people to adopt healthier habits and achieve better outcomes. With the reminders to move and data insights, we help the users engage more, access their own data and develop a better understanding of themselves to develop healthier lifestyles.

Last year, we launched Active Zone Minutes, a new personalized standard for tracking physical activity beyond



steps, based on PurePulse heart rate tracking that helps users move more efficiently and achieve better overall health. Active Zone Minutes uses your heart rate and age to go beyond counting steps and give credit for any workout that gets the heart pumping, because moderate and vigorous activity looks different for everyone. Active Zone Minutes is one of the many ways Fitbit is continuing to develop innovative technology to help users better understand and manage their heart health.

In addition to Active Zone Minutes, Fitbit Premium uses your unique data to deliver Fitbit's most personalized experience yet, with actionable guidance and coaching to help you achieve your health and fitness goals. It can help people eat better, sleep better and move more. We are aggressively working towards improving and adding more features to Fitbit Premium we expect Premium will continue to get smarter, provide more content, insights and personalization over the coming years.

**Since Covid-19 has turned all the tables on us, why do you think that now is the right time to buy Fitbit smart watches for fitness?**

COVID-19 has made staying healthy challenging, making it more important to

focus on our day-to-day health. Supporting our users and helping them to stay healthy and active at home, became our top priority. Fitbit's mission to make everyone in the world healthier was made for this moment and we quickly mobilized and innovated to help. We started offering free 90 days-trial of Fitbit Premium, developed Fitbit Flow- a high-quality, easy-to-use, low-cost emergency ventilator, which received FDA emergency use authorization for use during the pandemic. We also accelerated our critical research Stanford, Scripps Research, King's College London to determine of Fitbit devices and other wearables can be used to detect potential signs of Fitbit. Over 100,000 community even supported Fitbit's COVID-19 study to determine if we can build an algorithm to detect potential signs of the disease before symptoms are reported by the user.

To understand better in terms of how people are focusing on their health during COVID-19 restrictions, we conducted a survey with over 1,000 people across the UAE. The respondents were asked to share their perception of their personal health, stress and lifestyle habits in the wake of COVID-19. The survey revealed that people are becoming more conscious of their personal health and activity in the wake of local lockdowns and are placing greater priority on improving their health and wellbeing.

55% of the UAE respondents stated that they are prioritizing their personal health now more than ever. 66% of consumers surveyed have experienced a positive change when it comes to their personal health throughout the pandemic, stating that they have developed healthier personal habits and behaviors. Sleep was one of the biggest positive changes noted in the UAE. Improvements in sleep were seen in over half of the responses with survey participants (61%) getting a longer night's rest. The work from home has positively impacted UAE residents' in some ways as they started picking up new hobbies and talents and spending more quality time with family (81%) and an improvement in their diet was also seen (74%) due to remote working.

COVID-19 has shown us all how critical it is to take care of both our physical and mental health and wellbeing. Fitbit technology has become more sophisticated and accurate. Wearables have evolved considerably since we pioneered the category more than ten years ago with the launch of Fitbit Classic. We believe the more a user understands about their personal health, the more empowered they are to make meaningful behavior change.

Today, our new products and services are our most innovative yet, coupling our most advanced sensor technology and algorithms to unlock more information about our bodies and our health so you can be in control. We are breaking new ground with our wearables, helping you better understand and manage your stress and heart health, and pulling your key health metrics together in a simple and digestible way to track

things like skin temperature, heart rate variability and SpO2 so you can see how it's all connected.

### ***Tell us about your recent partnership with Deepak Chopra? Why did you partner with him?***

Fitbit recently announced its partnership with Deepak Chopra, M.D., Pioneer of Integrative Medicine and Founder of The Chopra Foundation and Chopra Global to launch Deepak Chopra's Mindful Method, an exclusive wellness collection created and curated for Fitbit Premium members to make a mindfulness practice more accessible to people worldwide. Fitbit's Mindful Method is designed to help you improve your emotional wellbeing as an important part of your overall health, featuring audio and video sessions led by Deepak Chopra on impactful, relevant themes like mindfulness, sleep, stress management, mental wellness and the mind-body connection. The new collection expands the existing mindfulness and stress management offerings from Fitbit, continuing to help give you a complete view of your holistic health to understand how each aspect fits together to impact your overall wellbeing.

Both Fitbit and Deepak Chopra share similar thoughts, we are both working towards giving the guidance and support that people need to improve their emotional and physical wellbeing. His expertise and our solutions will help us achieve our mission to make everyone in the world healthier through a holistic approach to health and wellness.

## **Our honest review**

In this month's issue, fitbit collaborated with Mediworldme to test how their new smart watch fitbit Sense manages stress levels effectively. They were also kind enough to give me their watch for keep. Recently, the company made waves in making fitness a priority during this pandemic in all there smart watches.

Since the pandemic struck me so hard last year, I went into hiding indoors to protect myself from been infected. However, thanks to fitbit sense, I was again motivated to get my steps in when possible, monitor my stress levels and heart health and further take more steps to improve my overall wellbeing, considering that I am media person and also at the same time giving me a comprehensive look on my overall health.

The Sense is packed with health and fitness features. It records your heart rate every five seconds, counts steps and active time, and automatically adjusts high and low heart rate alerts, move reminders and daily activity goals. Made of stainless steel, the Sense is small and light, making it comfortable to wear both day and night. The right side of the case has a small touch-sensitive solid-state sensor that acts as a button, and causes the watch to buzz slightly when pressed.

Since receiving the smartwatch, I have took it on all my brisk walks and runs around my neighborhood; during that time, the Sense's GPS and heart rate monitor were accurate and fast, and it was easy to read even when on the move. The Sense has other functions, including the ability to customize what's on the screen as you're running, setting the screen to Always-on while you're exercising, Auto-pause and Run Detect.

The watch can also track biking, Bootcamp, circuit training, elliptical, golf, hiking, interval workouts, kickboxing, martial arts, Pilates, spin, swim, tennis, treadmill, yoga and more.

The watch also has an impressive battery life of minimum 6 days and in my case maximum 10 days on continuous use. Though I have never tried any smart watches before, but fitbit Sense has impressed with me a lot by keeping me on my feet and at the same time keeping my overall health in check. If you are a first timer like me who is looking to buy a smart watch, look no further as fitbit Sense is the right watch for you in maintaining your overall wellbeing.



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# MiDiPATH project

## Digital Microscopy in PATHological Anatomy



**digital microscope is a variation of a traditional optical microscope that uses optics and a digital camera to output an**

**image to a monitor, sometimes by means of software running on a computer. A digital microscope often has its own in-built LED light source, and differs from an optical microscope in that there is no provision to observe the sample directly through an eyepiece. Since the image is focused on the digital circuit, the entire system is designed for the monitor image. The optics for the human eye are omitted.**

Digital microscopes can range from cheap USB digital microscopes to advanced industrial digital microscopes costing tens of thousands of dollars. The low price commercial microscopes normally omit the optics for illumination and are more akin to webcams with a macro lens. For information about stereo microscopes with a digital camera in research and development, see optical microscope.

The global digital microscopes market size is estimated to be valued at \$1,124.0 million in 2020, and is expected to exhibit a CAGR of 6.5% between 2020 and 2027, according to Coherent Market Insights.

The demand for digital microscopes is expected to increase in the current coronavirus (Covid-19) pandemic. Due to this, pathologists and laboratory worker have started to work from home or remotely. Moreover, digital pathology (digital microscopes) which includes the capturing of high-resolution images of tissue specimen, is one of the factor that has enabled the pathologists to maintain and regulate operations remotely during the pandemic. These digital images can be viewed anywhere and easily shared for second opinions and consults, or in digital teaching sets, overcoming the limitations of working with physical glass slides and microscopes.



**Marine Malbert**

### ***MiDiPATH project***

Digital Microscopy in PATHological Anatomy and Cytology) aims to design and develop a set of new digital tools, helping anatomical pathologists refine very serious diseases diagnosis, such as cancers. The tools are specifically designed for the detection of rare elements.

The project brings together the "Centre Hospitalier public du Cotentin" based in Cherbourg, the GREYC laboratories (University of Normandy) based in Caen, and Epinest, a company based in Colombelles. All of the three partners are located in Normandy, France.

This collaborative project is funded by Région Normandie and by the European Union (FEDER).

MiDiPATH project is prizewinner of the "Oncochimie" initiative launched by the Normandie region in partnership with the POLEPHARMA cluster.

Marine Malbert, Responsable RH & Communication at Epinest tell us in detail the purpose of MiDiPATH project in an email interview.

### ***Tell us in detail about MiDiPATH?***

First, let's explain what Midipath means. MiDiPATH is Digital Microscopy in PATHological Anatomy and Cytology and aims to design and develop a set of new digital tools, helping anatomical pathologists refine very serious diseases diagnosis, such as cancers. The tools are specifically designed for the detection of rare elements.



What is the main aim of this project?

The main aim of our project is to make it possible for everyone to have access to early detection of certain types of cancer and to be treated at a very early stage of the disease. This makes it possible to avoid, in certain cases, having to resort to heavy treatments, essential when the detection is done later.

How does this project aim to design and develop a set of new digital tools?

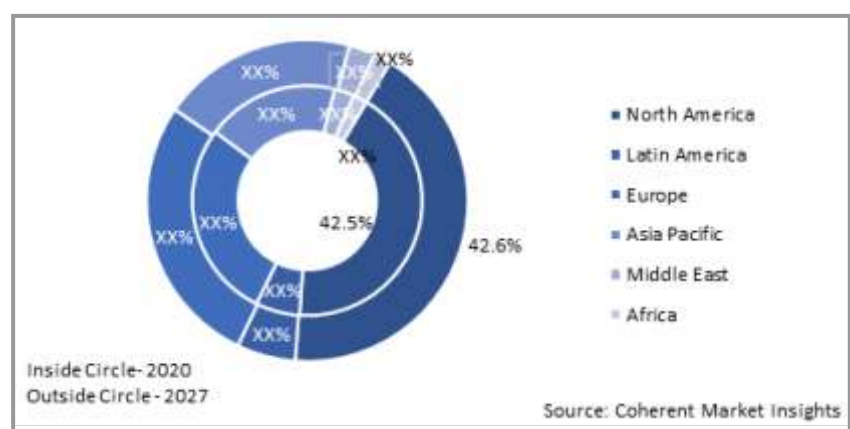
Combining Internet of Things (IOT), AI (artificial intelligence) and machine learning, the use of this combination in the Midipath project will give rise to other products aimed at covering more pathologies.

### ***Tell us in detail about Digital Microscopy and what role does it play in this project?***

Digital microscopy requires the equipment of classic light microscopy with computerized imaging system. An image of the sample is observed in real-time on a computer screen. This

technique includes optical imaging, save feedback information about the microscope status and camera set points. Our project uses digital microscopy in order to receive extremely reliable analyzes, with a much smaller margin of error and unmatched speed.

### ***How does digital microscopy help in diagnosing diseases?***



Digital microscopy allows imaging and measurement at micrometric scale (length, angle, surface, depth, roughness, etc.) of all sample types. Also, looking through an eyepiece for hours is very tiring. Instead of that, the pathologist can sit in a comfortable upright position while viewing a sample on the monitor screen. This makes the working environment easier and more reliable in the analysis

### ***How is it known to be a powerful tool in medicine and bio medical research?***

For example, when a surgeon is operating, he sometimes has to take a sample from





the patient and needs a quick diagnosis from the pathologist to go further. In some networks of hospitals, the pathologist is not always available, nor on the right site. He is therefore called in emergency, and sometimes spends a considerable amount of time in the car for a few minutes of observation under the microscope. With this technology, the surgeon takes the sample and gives it to a technician who can scan it. The pathologist receives the sample in his mailbox and can complete the protocol to send it back to the surgeon, who can continue the operation. Moreover, several cancer research centers welcome many researchers for two or three years. Each takes hundreds of samples for their studies, which end up in drawers, without any traceability of these slides. To stop such a loss, they will systematically digitize their samples, and will need software like ours to track their activities and feed their biobank. This biobank could be used for future research, in particular by reducing their cost, and by limiting the need for the production of new slides.

### **Developments in tech and engineering have allowed the creation of alternatives to high cost diagnostic devices? Your say in this?**

A very important factor to remember in this field is the considerable technological advance in recent years in the computing capabilities of personal machines. With advances in algorithms and neural networks we can reach with our technology the same results or even better avoiding big investment in super calculators.

### ***A digital microscope has the same functions as a typical compound microscope. What are its major differences?***

Digital microscopes have higher magnification than many optical microscopes because of the use of the computer monitor size to determine the magnification. In addition, digital microscopes provide very high quality images since they project the image directly onto the camera. Other features are also important such as high dynamic range (HDR) for better contrast and color depth, more image texture, speed and of course storage capacity which allows pathologists to reference and examine the images to create detailed reports which gives us the ability to perform deep analysis and identification of rare elements.

### **Describe the designing of tools for the detection of rare elements?**

Producing detection tools means training AI algorithms for all possible scenarios which is deep learning. The bulk of the development is this Neural Network 'training'. This process allows the tool to display a virtual slide and the keystone is that the robot can understand exactly what is asked. The algorithm retains corrections, refines its search, gains in precision, and at some point, the model is robust. The classification that it

automatically suggests to the expert is then at least as precise as a manual classification, and above all, exhaustive, since it takes into account all the pixels of the image. The algorithm can be switched to routine use, and the time savings become considerable. The amount of information sent to the doctor is drastically reduced. The information is concentrated, made more reliable, makes the diagnosis faster and is put at the service of the doctor. Because there is no question of supplanting his diagnosis, nor his expertise.

### **Is your digital microscopy mobile-based?**

Midipath is a set of analysis tools that uses digital microscopy technology. Midipath itself is cross-platform and therefore mobile-based. This means that if the system such as the digital microscope is mobile, then the solution is mobile too.

### **Can a digital microscopy replace a traditional microscopy? If so, why? Your opinion on this?**

It's a revolution that the world of medicine is going through. Innovations make it possible to digitize, store, classify and share these slides with a quality of resolution and increasing analysis, which equals or exceeds the precision of the microscope. Storage spaces and internet connections are now secured and sophisticated enough to meet tools such as Midipath. Our opinion is that the mechanics that are put in place have been already evolved. Through the vector of education alone, the next generation of pathologists will work primarily on digitized environment.



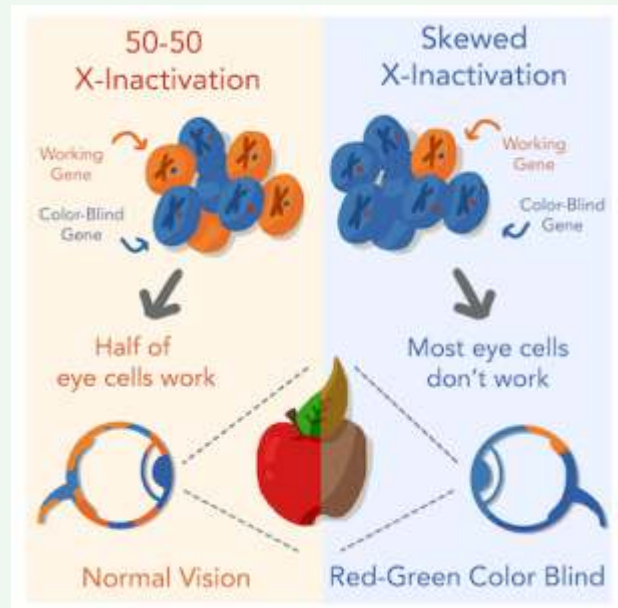
## UAE researchers develop contact lenses to correct color blindness

Color blindness is not always inherited, there are many other factors as well that are responsible for causing color blindness among people which includes macular degeneration, diabetic retinopathy, glaucoma, any Injury to the eye and aging as well. Multiple factors are anticipated to influence the market growth. The market growth is anticipated to be primarily driven by increasing government initiatives toward health awareness; rise in healthcare expenditure worldwide and growing cases of color blindness is expected to fuel the growth of the global color blind test market

**C**olor blindness occurs when you are unable to see colors in a normal way. It is also known as color deficiency. Color blindness often happens when someone cannot distinguish between certain colors. This usually happens between greens and reds, and occasionally blues, according to American Academy of Ophthalmology.

In the retina, there are two types of cells that detect light. They are called rods and cones. Rods detect only light and dark and are very sensitive to low light levels. Cone cells detect color and are concentrated near the center of your vision. There are three types of cones that see color: red, green and blue. The brain uses input from these cone cells to determine our color perception.

Color blindness can happen when one or more of the color cone cells are absent, not working, or detect a different color than normal. Severe color blindness occurs when all three cone cells are absent. Mild color blindness happens when all three cone cells are present but one cone cell does not work right. It detects a different color than normal.



There are different degrees of color blindness. Some people with mild color deficiencies can see colors normally in good light but have difficulty in dim light. Others cannot distinguish certain colors in any light. The most severe form of color blindness, in which everything is seen in shades of gray, is uncommon. Color blindness usually affects both eyes equally and remains stable throughout life.

### Market size

As per a new report by WiseGuyReports' 'Global Color Blind Test Market Size, Status and Forecast 2019-2025, the global color blind test market is anticipated to witness steep growth in the next few years. Color blindness actually results from the light-sensitive pigments in the cones of the retina that receive wrong genetic coding for wavelengths of light. Color blindness testing is a part of Eye care test which is done to detect red/green color deficiencies among people. Increasing color blindness problem among people have resulted in the expansion of color blind test market.

Color blindness is not always inherited, there are many other factors as well that are responsible for causing color blindness among people which includes macular degeneration, diabetic retinopathy, glaucoma, any Injury to the eye and aging as well. Multiple factors are anticipated to influence the market growth. The market growth is anticipated to be primarily driven by increasing government initiatives toward health awareness; rise in healthcare expenditure worldwide and growing cases of color blindness is expected to fuel the growth of the global color blind test market.

Also the advancement in technology has made testing of color blindness easier and comfortable. However, inadequate reimbursement policies and lack of awareness among people might hinder the growth of color blind test market to certain extent.



**NORMAL VISION****GREEN****YELLOW****RED****COLORBLIND EXAMPLE****GREEN****YELLOW****RED**

## Contact lenses to correct color blindness

**Researchers in the United Arab Emirates have developed contact lenses that can help to correct color blindness. Containing gold nanoparticles, the lenses help to increase red-green contrast in wearers while also functioning as corrective lenses. The particles give the lenses a rose tint, which will hopefully result in wearers having a more positive experience when viewing the world, rather than the misplaced optimism typically associated with such tinted eye wear.**

Red-green color blindness can pose a variety of challenges, such as having difficulty knowing when to stop at traffic junctions in response to a red light. Researchers have been developing ways to improve red-green contrast for those who experience such color blindness.

One solution is to use red-tinted glasses. However, such glasses are bulky, and not everyone likes wearing glasses. To address this, these researchers have been developing contact lenses that can achieve similar results. Initially, they tested lenses that had been dyed pink, but noticed that they leached dye, meaning that they were unstable and potentially unsafe.

The team then turned to gold nanocomposites, which have been used for centuries to create “cranberry glass,” which has a pink hue. The researchers mixed gold nanoparticles into a hydrogel and used this to fabricate the lenses. The pink-tinted constructs filtered light between 520–580 nm, which is where the wavelengths of red and green light coincide.

So far, the researchers have tested the effectiveness and safety of the lenses in the lab. They found that the modified lenses were not toxic in cells grown in vitro and had similar water retention properties as commercial lenses, suggesting that they are safe for use.

They compared the gold nanoparticle-modified lenses to two types of tinted glasses that are available commercially for those with color blindness and found that the lenses were more highly selective in blocking certain wavelengths than the glasses. The next steps will involve human trials to see if the lenses are comfortable and can successfully help with red-green contrast in those with color blindness.



# South Korea

## Asia's fastest growing healthcare market

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According to the Ministry of Food and Drug Safety (MFDS), the market size for the medical device sector in South Korea has doubled since 2010. Ranked 9th in the world in 2018, Korea's market reached approximately \$6.2 billion in 2018 and imports from the US increased from 0.9 billion in 2010 to \$1.8 billion in 2018





South Korea is a country in East Asia, constituting the southern part of the Korean Peninsula, and sharing a land border with North Korea. 25 million people, around half of the country's population of more than 51 million people, live in the Seoul Capital Area, the fifth-largest metropolitan area in the world.

South Korea is a developed country and is ranked as the seventh-highest country on the Human Development Index in Asia. Its economy ranks as the world's tenth-largest by nominal GDP. Its citizens enjoy one of the world's fastest Internet connection speeds and the most dense high-speed railway network. The country is the world's fifth-largest exporter and eighth-largest importer. South Korea was in 2017 the world's 7th largest emitter of carbon emissions and the 5th largest emitter per capita. Since the 21st century, South Korea has been renowned for its globally influential pop culture, particularly in music (K-pop), TV dramas and cinema, a phenomenon referred to as the Korean Wave.

South Koreans have access to a universal healthcare safety net, although a significant portion of healthcare is privately funded. In 2015, South Korea ranked first in the OECD for healthcare access. Satisfaction of healthcare has been consistently among the highest in the world – South Korea was rated as the second most efficient healthcare system by Bloomberg.

The quality of South Korean healthcare has been ranked as being among the world's best. It had the OECD's highest colorectal cancer survival rate at 72.8%, significantly ahead of Denmark's 55.5% or the UK's 54.5%. It ranked second in cervical cancer survival rate at 76.8%, significantly ahead of Germany's 64.5% or the US at 62.2%. Hemorrhagic stroke 30 day in-hospital mortality per 100 hospital discharges was the OECD's third lowest at 13.7 deaths, which was almost half the amount as the US at 22.3 or France's 24 deaths. For Ischemic stroke, it ranked second at 3.4 deaths, which was almost a third of Australia's 9.4 or Canada's 9.7 deaths. South Korean hospitals ranked 4th for MRI units per capita and 6th for CT scanners per capita in the OECD. It also had the OECD's second largest number of



hospital beds per 1000 people at 9.56 beds, which was over triple that of Sweden's 2.71, Canada's 2.75, the UK's 2.95, or the US at 3.05 beds.

### Healthcare in South Korea

South Korea's public healthcare system is referred to as National Health Insurance (NHI). It is of extremely high quality and all residents living in Korea for a period longer than six months are required to register. When using the healthcare system in urban areas, it is common to find English speaking doctors and staff members.

The quality of Korean people's lives has been increasingly improved in general due to the development of medical technology. The average life expectancy for males increased from 51.1 in the 1960s to 75.7 in 2006. The change in average life expectancy for females is even more startling, from 53.7 in the 1960s to 82.4 in 2006. In 2007, the crude birth rate was 10.1 and the crude death rate 5.0. Infant mortality is also decreasing gradually, from 61.0 per 1,000 live births in the 1960s to 5.3 per 1,000 in 2005. The total fertility rate is sharply decreasing, from 1.67 in 1985 to 1.13 in 2006.2. However, the increasing elderly population and decreasing birth rate are changing family structure in South Korea. The aging population is also becoming a social burden due to increasing medical expenses.

In South Korea, only authorized healthcare professionals can provide health services. The Medical Law stipulates that only doctors, dentists, nurses, oriental medical doctors, and midwives licensed by the Ministry of Health, Welfare and Family Affairs (MIHWAF) can provide health services. Nurse's aides, acupuncturists, and massage therapists are described as quasi-medical professionals. As of 2007, there were 91,400 physicians, 23,114 dentists, 16,663 oriental medical doctors, 57,176 pharmacists, 8,587 midwives, and 235,687 nurses in South Korea.

Korean patients can go to any doctor or any medical institution, including hospitals, which they choose. The referral arrangement system is divided into two steps. The patient can go to any medical practitioner office except specialized general hospitals. If the patient wants to go to a secondary hospital, he/she has to present a referral slip issued by the medical practitioner who diagnosed him/her first. There are some exceptions: in the case of childbirth, emergency medical care, dental care, rehabilitation, family medicine services, & hemophiliac disease, the patient can go to any hospital without a referral slip.

South Korea's healthcare security system has three arms: the National Health Insurance Program, Medical Aid Program, and Long-term Care Insurance Program.



## Medical Device Market Overview - By Year

Year	2010	2015	2016	2017	2018
Market Size	2,920	4,113	4,362	4,850	5,629
Production Amount	2,218	3,906	4,161	4,557	5,375
Exports	1,258	2,396	2,515	2,800	3,280
Imports	1,961	2,602	2,716	3,093	3,534
Import from the US	816	1,215	1,270	1,452	1,651
Exchange Rate: \$1	1,156.00	1,131.52	1,160.41	1,130.48	1,100.58

According to the Ministry of Food and Drug Safety (MFDS), the market size for the medical device sector in South Korea has doubled since 2010. Ranked 9th in the world in 2018, Korea's market reached approximately \$6.2 billion in 2018 and imports from the U.S. increased from 0.9 billion in 2010 to \$1.8 billion in 2018.

To successfully identify business opportunities, it is essential to take a closer look into the unique aspects of Korea's medical device market. The ratio of local production to imports has been steady at less than 40 percent over the past decade. In addition, nearly 80 percent of South Korean medical device manufacturers are small- and medium-sized enterprises (SMEs) with less than \$1 million in revenue. South Korea's medical devices are classified into the four categorical levels according to the product's purpose and the degree of potential risk. As of 2018, over 65 percent of Korean medical device manufacturers are producing relatively low-risk medical devices (level 1 and 2).

In other words, South Korean companies make comparatively lower-end (mid-technology) medical devices. Therefore, market demand for high-end medical devices relies on imports. Among the list of importing countries in 2018, the U.S. consists of nearly half (47 percent) of total imports, followed by Germany (17 percent), and Japan (10 percent).

### Medical Korea

Korea is emerging as a new leader on the global healthcare market through quality services, advanced medical technologies, relatively affordable medical costs, fast and efficient diagnostics and therapeutic services, cutting-edge hardware and IT-based infrastructure. Medical Korea stands for Smart Care and has been set up by the Korea Health Industry Development Institute (KHIDI), which works through conferences, exhibitions and other promotional activities to promote Korean healthcare facilities including traditional medicine for medical tourists.

Korea's highly specialized doctors provide top-tier treatment for cancer, cardiovascular diseases, spinal disc injuries, organ transplantation, dentistry, cosmetic surgery, dermatology and more.

Korea is the leading country for clinical trial cases and ranks as Asia's best in international medical journal publications. Data provided by the US government agency National Institutes of Health (NIH) reveals that while Korea ranked sixth globally,

Seoul was named the city with the most clinical trials last year.

Most Korean hospitals are non-profit organizations, putting patient safety and satisfaction ahead of profits.

The Korean government has strict regulation over hospitals to ensure optimum medical services. Patients opting for treatment in Korea can rest assured of receiving optimum medical care.

Moreover, the 11th Global Healthcare and Medical Tourism Conference started its online and offline events recently, organized by the Korea Health Industry Development Institution (KHIDI) and sponsored by the Ministry of Health and Welfare.

Shortened as Medical Korea 2021, the event presented academic conferences, briefing sessions, seminars, public relations events, and business conferences online while complying with the government's quarantine measure.

Participants will discuss global healthcare development's direction to recover from Covid-19 and return to a healthy daily life.

Medical Korea 2021 is one of the largest international events held by the Korean government to analyze global healthcare trends, discuss ways to attract international patients, and demonstrate the Korean healthcare sector's excellence before global participants, officials said.

In this year's event, major agenda items included global healthcare, academic exchanges between medical experts, and Korean medicine's global competitiveness, accompanied by lectures from 52 Korean and foreign experts in healthcare and other related sectors.

In the session on the global competitiveness of Korean medical care, foreign patients and international experts introduced their experiences of receiving treatments and medical training, including their outstanding medical technology and safe medical system.

At the global healthcare section, participants presented the industry's post-Covid-19 response strategy from policy, law, and marketing.

Eight briefing sessions provided the latest information on health care policies, systems and industry for domestic medical institutions, companies attracting foreign patients, and those wishing to expand the business overseas.



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## AI-powered sound system to detect irregular heartbeats

Researchers at the University of Washington have developed an AI-powered sound system that can detect irregular heartbeats. The system sends inaudible sounds into its close environment and then analyzes the reflected waves to identify individual heartbeats from someone sitting close to it. The technology may be useful in detecting heart rhythm disorders, such as cardiac arrhythmias.

"Heart rhythm disorders are actually more common than some other well-known heart conditions. Cardiac arrhythmias can cause major morbidities such as strokes, but can be highly unpredictable in occurrence, and thus difficult to diagnose," said Arun Sridhar, a researcher involved in the study, in a press release. "Availability of a low-cost test that can be performed frequently and at the convenience of home can be a game-changer for certain patients in terms of early diagnosis and management."

A major challenge in developing the technology was detecting the heartbeats and distinguishing them from breathing sounds, which are much louder. "The motion from someone's breathing is orders of magnitude larger on the chest wall than the motion from heartbeats, so that poses a pretty big challenge," said Anran Wang, another researcher involved in the study.

"And the breathing signal is not regular so it's hard to simply filter it out. Using the fact that smart speakers have multiple microphones, we designed a new beam-forming algorithm to help the speakers find heartbeats."

The AI powered speakers employ an algorithm that uses the signals from multiple microphones on the device to identify the heartbeat, which is similar to the way that commercial smart speakers, such as Alexa, can use multiple microphones to listen to one voice in a room filled with other noises.

So far, the researchers have tested the technology in a group of healthy volunteers and a group of patients with a variety of cardiac conditions, and compared it with a commonly used conventional heartbeat monitor. The system detected a median inter-beat interval that was within 30 milliseconds or less of that detected by the control device, suggesting that it is comparable in terms of accuracy.

Right now, the system is suitable



for a quick spot check of the heart rhythm, and a user needs to intentionally position themselves close to the device before it can analyze their heart beats. However, the researchers hope that future iterations of the technology may be able to monitor heart health continuously, even during sleep.

"If you have a device like this, you can monitor a patient on an extended basis and define patterns that are individualized for the patient. For example, we can figure out when arrhythmias are happening for each specific patient and then develop corresponding care plans that are tailored for when the patients actually need them," said Sridhar. "This is the future of cardiology. And the beauty of using these kinds of devices is that they are already in people's homes."



## 3D printing could pave way for organ printing in the future

Researchers at University at Buffalo in New York have developed a new technique that allows them to rapidly 3D print hydrogel materials containing viable cells. The researchers hope that their method will pave the way for 3D organ printing in the future.

Current limitations include the slow pace of 3D printing, leading to poor viability of such printed constructs. The new technique, called fast hydrogel stereolithography printing (FLOAT), significantly reduces the environmental stresses placed on encapsulated cells that are typical with other techniques.

The shortage of donor organs for transplant has spurred a huge research effort to develop lab-produced alternatives. 3D printing holds enormous promise in this regard, and researchers hope that one day they will simply be able to print an entire organ. This concept typically involves printing a biocompatible matrix, such as a hydrogel, that contains live cells.

However, the printing process can be harsh for the encapsulated cells, and the long printing times don't help. With the ability to quickly print hydrogel constructs, this new technique helps living cells survive the printing process. "The technology we've developed is 10-50 times faster than the industry standard, and it works with large sample sizes that have been very difficult to achieve previously," said Ruogang Zhao, a researcher involved in the study.

Through tight control of the photopolymerization conditions, the technique can produce centimeter-sized hydrogel constructs within minutes. The team also tested its ability to print cells and embedded blood vessel networks, which will be crucial for the proper function of 3D-printed organs. Indeed, the researchers have shown that it is highly suited to this task.

"Our method allows for the rapid printing of centimeter-sized hydrogel models. It significantly reduces part deformation and cellular injuries caused by the prolonged exposure to the environmental stresses you commonly see in conventional 3D printing methods," said Chi Zhou, another researcher involved in the study.

The printed vessel networks within the hydrogel constructs allow nutrient solution to penetrate deep into the constructs, a crucial factor in achieving viable printed organs.



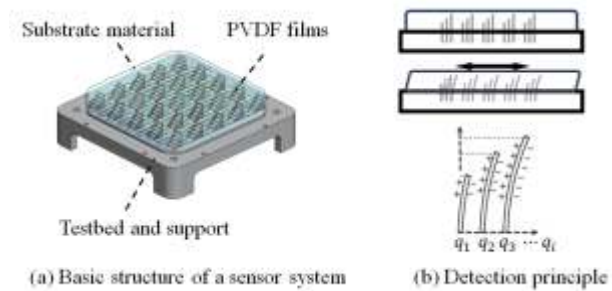
## Soft sensor for sensitive measurement of shear forces applied to surface

Researchers at the City University of Hong Kong have developed a soft sensor for sensitive measurement of shear forces applied to its surface. When attached to robotic grippers, the tactile sensing allows for fine control of grasped objects, enabling the robot to perform impressive feats, such as threading a needle and gripping an egg without breaking it. The researchers hope that the sensor may be useful for next-generation prostheses that can accomplish tasks that require very fine control.

Human skin is adept at detecting shear force, which is the force that occurs when two objects slide over each other. When you feel something slipping out of your hand, your natural reaction is to tighten your grip, but robots (or powered prostheses) cannot typically do the same. This means that it can be difficult to perform certain tasks using robotic hands or grippers, and they tend to be a little clumsy.

These issues have inspired this latest flexible sensor, which mimics the multilayered nature of the skin. The top layer is magnetized, and when a shear force is applied to it and deforms the sensor, it registers the resulting change in the magnetic field. It can also distinguish between shear force and the external force applied perpendicularly to a gripped object.

"It is important to decouple the external force because each force component has its own influence on the object," explained Yan Youcan, a researcher involved in the study. "And it is necessary to know the accurate value of each force component to analyze or control the stationary or moving state of the object,"



The system uses machine learning to accurately characterize the position of the stimuli acting on it. "We have developed an efficient tactile super-resolution algorithm using deep learning and achieved a 60-fold improvement of the localization accuracy for contact position, which is the best among super-resolution methods reported so far," said Dr Shen Yajing, another researcher involved in the study. "To the best of our knowledge, this is the first tactile sensor that achieved self-decoupling and super-resolution abilities simultaneously,"

So far, the sensor has enabled a robotic gripper to complete some intricate tasks, suggesting that it may give prosthetic devices extra dexterity. For instance, the sensors allowed the gripper to hold an intact egg in place without breaking it, while a researcher attempted to pull it away. "The super-resolution of our sensor helps the robotic hand to adjust the contact position when it grasps an object. And the robotic arm can adjust force magnitude based on the force decoupling ability of the tactile sensor," said Yajing.

"This proposed sensor could be beneficial to various applications in the robotics field, such as adaptive grasping, dextrous manipulation, texture recognition, smart prosthetics and human-robot interaction," Yajing added. "The advancement of soft artificial tactile sensors with skin-comparable characteristics can make domestic robots become part of our daily life."

Researchers at the Indian Institute of Science and SigTuple Technologies, a company based in Bengaluru, India, have developed a method to inexpensively measure hemoglobin levels in small-volume blood samples. The technique combines a microfluidic chip and an AI-powered microscope. The researchers hope that the technology will help streamline hemoglobin measurements and make things easier for patients, as only a small volume of blood is required, and clinicians, as the required equipment is relatively inexpensive.

Hemoglobin levels in the blood are an important health marker, and can be used to help diagnose a variety of conditions, including pulmonary fibrosis and anemia. At present, the equipment used to analyze blood samples for their hemoglobin content typically also measures a variety of other parameters, with dedicated compartments and optical detection equipment for each analysis.

This means that the equipment is bulky and expensive, and requires relatively large blood samples to function. However, a dedicated hemoglobin analysis system based on imaging could help to address these issues. "In this study, we demonstrate that the applicability of a system originally designed for the purposes of imaging can be extended towards the performance of biochemical tests without any additional modifications to the hardware unit, thereby

## Inexpensive method to measure hemoglobin levels in small blood samples

retraining the cost and laboratory footprint of the original device," said Srinivasan Kandaswamy, a researcher involved in the study.

The system consists of a microfluidic chip onto which a small-volume blood sample is loaded. The chip runs a sodium lauryl sulfate assay to detect hemoglobin within the sample. The chip can then be viewed using a microscope with automatic AI imaging analysis to estimate the amount of hemoglobin in the sample. The microscope uses a green LED to illuminate the sample as the sodium lauryl sulfate/hemoglobin complex absorbs light at this wavelength.

The chips are inexpensive, costing 0.136 USD each, including the required reagents. The technology also has potential to measure other substances in the blood, including cholesterol, protein, and glycated hemoglobin.

"This paper lays the foundation and will also serve as a guide to future attempts to translate conventional biochemical assays onto a chip, from point of view of both chip design and reagent development," said Kandaswamy.

## Robots to sense and measure patients' healthcare parameters

Researchers at Simon Fraser University in Canada have developed three different robots that can sense and measure patients' healthcare parameters, including electrocardiograms, oxygen levels, respiration rates, and temperature.

One of the robots, comprising a robotic arm, contains electrodes in its fingertips, and can take measurements when it makes contact with a patient. Another, a smart insole, can monitor patient gait when worn in a shoe. The third, a humanoid robot, can keep track of oxygen levels, which may be useful in the treatment of COVID-19 patients.

The researchers hope that future iterations of their technologies may lead to the development of a unified healthcare assistant that can aid doctors by autonomously obtaining vital information from patients. In the age of COVID-19, minimizing close contact between patients and clinicians could help to reduce transmission.

"The recent pandemic demonstrates the need to minimize human-to-human interaction between healthcare workers and patients," said Woo Soo Kim, a researcher involved in the study, in a Simon Fraser press release. "There's an opportunity



for sensing robots to measure essential healthcare information on behalf of care providers in the future."

The devices were created using 3D printed origami structures, and so far, have been able to determine a wide array of basic physiological data in volunteers. At present, the robots are largely passive in how they obtain information, but the researchers have said that it may be possible to use artificial intelligence to allow the devices to interact with patients, and perhaps even make decisions such as prescribing medications.

Such devices may become commonplace in the future for routine medical checkups or health monitoring.

## Microfluidic device to test the presence of SARS-CoV-2 and display results via cell phone



Researchers at Rice University have developed a microfluidic device that can test for the presence of SARS-CoV-2 in a drop of blood and display its results once plugged into a cell phone. The test runs in under an hour, and works by detecting SARS-CoV-2 nucleocapsid protein using antibody-studded magnetic nanobeads. In tests, the device could detect very low levels of the protein, suggesting that it could function as a sensitive diagnostic tool.

The fight against COVID-19 continues, and testing is one of our most commonly deployed and useful weapons in stopping the spread of the virus. PCR remains the gold standard test for the virus, but it is time consuming and requires highly trained lab technicians and equipment. Rapid tests that can be performed in doctors' clinics, airports, or even in pharmacies would be very useful in helping to prevent transmission.

These issues have inspired this latest device, which can detect a viral protein in a small drop of blood, such as that from a finger prick. People may have

personal preferences with regard to a finger prick or nasal swab, but it may be nice not to have to insert a large swab deep inside your nose to determine your COVID status. One of the other big benefits of the device is its portability.

"What's great about this device is that doesn't require a laboratory," said Peter Lillehoj, a researcher involved in the study, in a Rice announcement. "You can perform the entire test and generate the results at the collection site, health clinic or even a pharmacy. The entire system is easily transportable and easy to use."

The microfluidic chip contains magnetic nanobeads studded with antibodies against the SARS-CoV-2 nucleocapsid protein. "There are standard procedures to modify the beads with an antibody that targets a particular biomarker," said Lillehoj. "When you combine them with a sample containing the biomarker, in this case SARS-CoV-2 N protein, they bond together."

An external magnet draws the beads towards an electrochemical sensor that generates a current in response to the captured protein. When plugged into a standard smartphone, the device sends these data to an app for easy interpretation of the results. The test is rapid, providing results in as little as 55 minutes, and can detect as little as 50 picograms of the protein per milliliter.



The Carter Center and The Global Institute for Disease Elimination (GLIDE) announced an exciting new partnership to support the Carter Center's innovative disease elimination efforts in the Americas.

**GLIDE, an initiative of the Crown Prince Court of Abu Dhabi and the Bill & Melinda Gates Foundation, has pledged substantial financial and technological support for the Center's programs to eliminate two neglected diseases: river blindness (onchocerciasis) in the Amazon rainforest along the Brazil-Venezuela border and lymphatic filariasis (commonly called LF or elephantiasis) throughout Hispaniola, the island shared by Haiti and the Dominican Republic. The initiative also supports malaria elimination from Hispaniola.**

This new partnership will help accelerate progress toward achieving the goals in the newly launched World Health Organization Neglected Tropical Diseases Roadmap 2021-2030, which includes targets for a 90% reduction in the number of people requiring treatment for NTDs and elimination of at least one NTD in 100 countries.

Since 1993, the Carter Center's Onchocerciasis Elimination Program for the Americas (OEPA) has been working to eliminate river blindness transmission in North, Central, and South America by partnering with six nations' ministries of health, the Pan American Health Organization (PAHO), and many other partners. These joint efforts have succeeded in eliminating transmission of the disease from Colombia, Ecuador, Mexico, and Guatemala (each officially verified by the World Health Organization). In the Americas, transmission of the parasite continues only in an isolated, hard to reach area deep in the Amazon rainforest along the Brazil-Venezuela border, mainly affecting the Yanomami, a nomadic indigenous tribe living in that region.

River blindness is caused by bites of Simulium black flies infected by the parasitic worm *Onchocerca volvulus*; symptoms can include intense itching, rash, and visual impairment, potentially leading to permanent blindness. Transmission can be eliminated through long-term mass drug administration with the antifilarial medication ivermectin (donated by Merck & Co. Inc. under the brand name Mectizan®).

## GLIDE to support Carter Center's innovative disease elimination efforts in Americas

"The challenge is in finding and reaching the people who need the medication," said Gregory Noland, Ph.D., M.P.H., director of both the Carter Center River Blindness Elimination Program and its Hispaniola Initiative. "To eliminate river blindness from the Americas, we must reach everyone, even those living in the deepest parts of the rainforest."

The partnership with GLIDE will provide resources to test state-of-the-art technology to help locate and quickly treat people in the most remote unreachable rainforest villages, the last vestige of the disease in the Western Hemisphere. Lessons learned from the Americas have helped to inform river blindness elimination efforts in Africa, where 99% of the remaining disease burden exists.

The island of Hispaniola, shared by Haiti and the Dominican Republic, accounts for 95% of the lymphatic filariasis (LF) burden in the Americas and is the last remaining malaria-endemic island in the Caribbean. Through its Hispaniola Initiative, The Carter Center has been working since 2008 with the governments of Haiti and the Dominican Republic to eliminate transmission of LF and malaria from Hispaniola. Achieving elimination of both diseases would be a historic achievement.

LF, or elephantiasis, is a mosquito-transmitted disease that damages the lymphatic system and can cause limbs and genitals to swell to disabling proportions. It is prevented with a combination of the drugs diethylcarbamazine (DEC) and albendazole (donated by Eisai and GSK, respectively), which are administered annually to at-risk communities for several years. Together with the ministries of health, The Carter Center takes an active role in drug distribution, program monitoring and evaluation, and providing care (including mental health support) for those who suffer complications from chronic LF.

Malaria is a mosquito-borne parasitic disease that kills approximately 400,000 people each year, mostly children, with about 228 million cases of the disease reported worldwide. Symptoms include fever, intense headaches, vomiting, body-shaking chills, and other flu-like symptoms. Without treatment, malaria can lead to anemia, hypoglycemia, cerebral malaria, coma, and death.

GLIDE's partnership will help Haiti and the Dominican Republic in their final push to eliminate both malaria and LF.

"We are privileged to help The Carter Center accelerate toward its goal of eliminating river blindness, LF, and malaria by partnering on this exciting, leading-edge initiative," said Simon Bland, the chief executive officer of GLIDE. "The learnings may well provide clues for how we speed up elimination efforts in other remote global communities and takes us one step closer to consigning diseases of poverty to the history books."





## MBRU joins the Association of American Medical Colleges to boost educational development of healthcare professionals

Mohammed Bin Rashid University of Medicine and Health Sciences (MBRU) has joined the Visiting Student Learning Opportunities (VSLO®) program, a service of the AAMC (Association of American Medical Colleges), to engage medical students and faculty worldwide and expand their international mobility. The collaboration will allow MBRU students to pursue opportunities for clinical electives in reputable medical schools in the United States and other participating countries.

This agreement further boosts MBRU's commitment of providing students with the best internationally available educational resources & elevates students' understanding of global best practices in the healthcare sector.

Professor Suleiman Al-Hammadi, Dean of the College of Medicine, said the partnership would grant students from both institutions valuable access to the latest developments in medical education and gain a better understanding of international best practices.

"Maintaining an international perspective and

incorporating relevant contemporary aspects that enhance the quality of healthcare education is very important to us. Through the collaboration with the AAMC, we are striving to broaden students' skillsets, give them the chance to interact with leading practitioners, and gain precious clinical experience under high-quality supervision," said Professor Al-Hammadi.

Professor of Microbiology and Infectious Diseases at the College of Medicine, Abiola Senok, said that MBRU's collaboration with the AAMC would provide students with a unique opportunity to expand their knowledge of healthcare systems and play an important role in enlarging their professional network.

"The collaboration with the AAMC will open up a wide array of academic and clinical experiences that will greatly add to our students' development as medical professionals. Students who opt to pursue their electives in affiliated institutions will benefit from interactions with the best minds in academic medicine, interact with leading researchers, and gain valuable experience from working with trusted data and cutting-edge tools," she said.

As part of the collaboration, fifth- and sixth-year students enrolled in the Bachelor of Medicine and Bachelor of Surgery (MBBS) program will be eligible to apply for and undertake elective clinical rotations in medical schools affiliated with the AAMC, thus strengthening their profiles should they wish to pursue a residency program in the U.S.

The agreement also enables MBRU to host students from AAMC-affiliated institutions in the future, providing U.S. medical students with valuable exposure to the growing healthcare sector in the UAE.

The AAMC's members are all 155 accredited U.S. and 17 accredited Canadian medical schools; more than 400 teaching hospitals and health systems, including Department of Veterans Affairs medical centers; and more than 70 academic societies. AAMC leads and serves over 179,000 full-time faculty members and 140,000 resident physicians. Consisting of a network of U.S. and international medical schools, the VSLO program provides an opportunity for medical and public health students to pursue clinical, global health, or research electives outside their home country.

"With ever-increasing globalization, medical students and institutions are seeking ways of incorporating global perspectives and experiences into their academic preparation," said Robin H. Carle, senior director of the VSLO program. "We are very happy to welcome MBRU into the VSLO program and look forward to their full engagement."

MBRU is committed to providing its students with training that conforms to the latest global standards and an educational program that is responsive to the evolving shifts in medical care regionally and globally.

## Amanat announces acquisition of Cambridge Medical and Rehabilitation Center



Amanat Holdings PJSC the GCC's largest healthcare and education investment company has announced the full acquisition of Cambridge Medical and Rehabilitation Center (CMRC) for an enterprise value of Dh851 million from TVM Capital Healthcare, an emerging market focused private equity firm. The transaction was funded through a combination of cash on hand and leverage. The transaction marks Amanat's first wholly owned investment in the healthcare sector in the UAE and one of the biggest GCC healthcare deals in recent years.

CMRC is a leading post-acute care and rehabilitation (PAC) provider in the UAE and KSA. Since inception, CMRC has grown to more than 250 beds across three facilities, two in the UAE, and one in the KSA. Alongside Sukoon, Amanat's portfolio company and a major long-term care provider in KSA, CMRC's scalable business model will be integral to Amanat's strategy in building a regional PAC platform.

H.E. Hamad Al Shamsi, Amanat's Chairman said, "The acquisition of CMRC offers Amanat a profitable and scalable business. Alongside Sukoon, CMRC has enabled us to create the largest PAC platform in the GCC with nearly 500 beds across Abu Dhabi, Al Ain, Jeddah and Dhahran and the potential to increase demand-led capacity further.

"With this transaction, Amanat has fully deployed its paid-up capital of Dh2.5 billion and now manages close to Dh3 billion in assets. We continue to deliver on our strategic objectives to invest in high yielding assets that are leading the transformation in the healthcare and education sectors delivering further value to our shareholders."

Dr. Mohamad Hamade, CEO of Amanat, added, "We have emerged as winners of a competitive bidding process to

acquire this high-profile asset in CMRC, which will constitute the cornerstone of Amanat's PAC platform. It is a genuinely unique and established provider with a leading market position and an experienced management team. In FY-2020, CMRC's revenues hit a record high of USD 75.3 million, EBITDA of USD 22 million & net income of USD 15.2 million."

Dr. Howard Podolsky, Group Chief Executive Officer of CMRC added, "Amanat's investment has come at a pivotal time for us. We have pioneered the successful roll-out of PAC in the region having established multiple facilities with over 250-beds across the UAE and KSA. Our new strategic investor, Amanat, brings a wealth of experience in accelerating the growth of healthcare businesses in the region. We look forward to the next phase of CMRCs' journey, where we will be integrating CMRC into Amanat's existing and potential portfolio of PAC companies."

Dr. Helmut Schuehler, Chairman and CEO of TVM Capital Healthcare, commented, "We are delighted to have found in Amanat the perfect buyer for CMRC, one that will take this first-class provider into the next phase of its development. We are extremely proud of the value we at TVM Capital Healthcare created with CMRC for patients, their families, the local healthcare systems in the UAE and Saudi Arabia, and our investors. This deal marks a major milestone, providing us with the momentum and optimism for our future investments across the Middle East and Southeast Asia. We wish CMRC, its management and its team continued success with the support of their new shareholders."

### What this acquisition means for Amanat

- **Amanat has fully invested its Dh2.5 billion in paid-up capital and tapped into its debt capacity to optimize its capital structure**
- **AUMs expanded to nearly Dh3 billion; 53% in healthcare and 47% in education**
- **Created the largest GCC PAC platform, a specialized sub-sector ripe for public-private partnership growth that will aid governments to diversify their healthcare budgets and optimize their specialized care offering in the region.**
- **Growth potential through geographic and service diversification with support from a strong and established management team and an asset light business model.**
- **Attractive market segment with strong market fundamentals conducive to growth, supported by ageing population, increased life expectancy and a significant supply gap in KSA.**

"Post-acute care and rehabilitation has proven to be one of the most resilient subsectors during the pandemic and we are now well-positioned to accelerate organic growth and pursue expansion across the GCC. We look forward to working closely with the public sector in the GCC in creating clusters of partnerships to develop healthcare service line integration where post-acute care services and other synergistic services are provided to address market demand through a more systematic relationship that offers long-term cost-effective synergies." Hamade concluded.

## Turkish Cargo flies UNICEF's covid-19 vaccines around the world



Holding the widest flight network in the world, Turkish Cargo undertakes an important mission within the extent of struggling the pandemic by carrying UNICEF's (United Nations International Children's Emergency Fund) Covid-19 vaccines and health equipment all around the world.

This successful brand, delivered 1.7 million doses of Covid-19 vaccine supplied by UNICEF from India to Kinshasa, the capital of the Democratic Republic of Congo, in cooperation with global shipping company Kuehne + Nagel. Having 30 years of experience in private cargo transportation, Turkish Cargo successfully delivered hundreds of thousands of Covid-19 syringes belonging to UNICEF from Barcelona to Tunisia and Covid-19 vaccines from Amsterdam to Kiev, Tbilisi and Amman.

Having a unique service quality as well as the widest flight network in the world, Turkish Cargo takes an important responsibility in delivering Covid-19 vaccines to the whole world, and continues to cooperate with national and

international authorities within the range of struggling the global pandemic.

In the past months Turkish Cargo has delivered China's Sinovac vaccines to different destinations in the world, continues to carry many different types of vaccines and delivers healthiness. The successful brand, which protects the cold chain in the most ideal conditions with its 'TK Pharma' product designed with the utmost sensitivity in private cargo transportation and designed in global standards, transports medicines and vaccines to all over the world with its operations with IATA CEIV (Center of Excellence for Independent Validators) pharma certificate.

Creating a global pharmaceutical corridor among more than 400 destinations in the world, Turkish Cargo reaches more than 300 destinations, 96 of which are direct cargo destinations, and continues to offer 24/7 basis to its customers in its global network by making use of its fleet of 365 aircraft.



## Etihad extends its global Covid-19 insurance

Etihad Airways, the national airline of the United Arab Emirates, has extended its COVID-19 global wellness insurance cover until 30 September 2021.

Martin Drew, Senior Vice President Sales & Cargo, Etihad Airways, said: "Extending Etihad's COVID-19 global wellness insurance reinforces the effectiveness of Etihad Wellness, the airline's health and hygiene program. It's an added benefit automatically provided to all guests - no exceptions.

"As Etihad continues to gradually expand its services to up to 60 destinations this spring, the airline wants to instill confidence to travel and hopes this additional cover will reassure guests Etihad is doing everything it can to keep them safe and protected."

Guests who are diagnosed with COVID-19 during their trip won't have to worry about medical expenses or quarantine costs when they fly with Etihad.



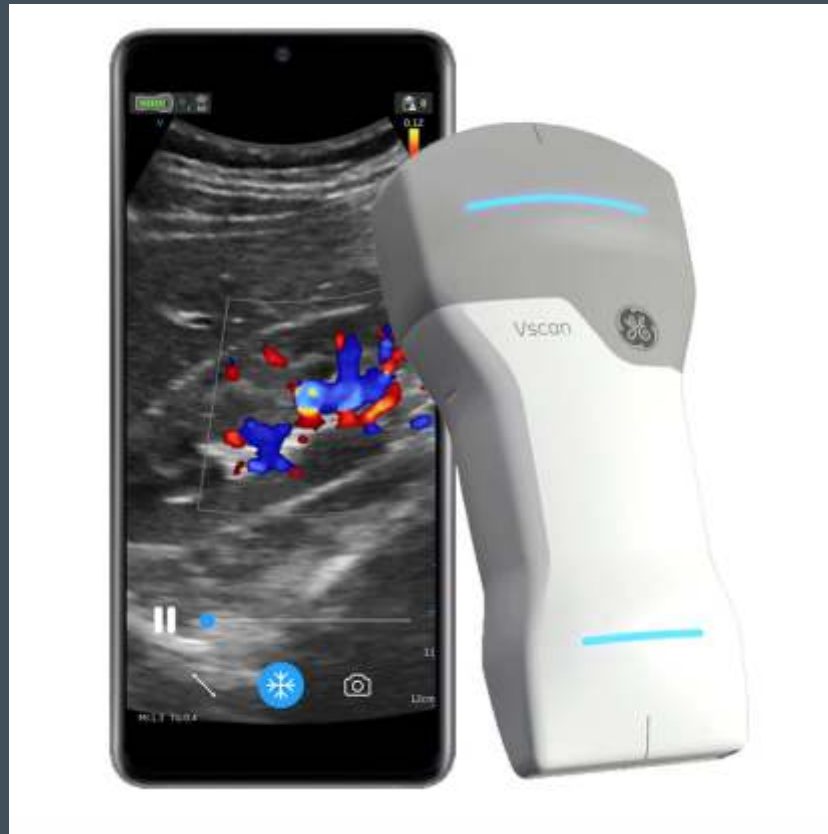
## GE Healthcare launches pocket-sized ultrasound device

GE Healthcare has announced that it has launched the Vscan Air wireless, pocket-sized ultrasound device.

Vscan Air is designed to offer clear image quality, whole-body scanning capabilities and an intuitive software platform delivered in a small handheld device, according to a news release.

Vscan Air is touted by GE Healthcare as one of the smallest and most lightweight handheld ultrasound devices on the market while offering exceptional image quality and advanced visualization software.

Among the Vscan Air benefits is the capability to complete both shallow and deep exams through a flip of the two-sided probe design, removing the need to switch probes in between or during clinical exams. Additionally, the



user-tested software design presets for fast scanning, while a single-button probe offers easy image capture and freezing.

## Izi Medical unveils Quick-Core Auto Biopsy System

Izi Medical Products has launched its Quick-Core Auto Biopsy System for soft tissue biopsies.

Quick-Core Auto is a lightweight, fully automatic biopsy device that builds upon the company's previous semi-automatic biopsy system.

Izi's Quick-Core Auto has three programmable firing modes for tissue sampling, including automatic, delay, and zero-throw modes. It is available in gauges 12G through 20G with lengths of 6cm to 25cm with and without coaxial needles.



# UPCOMING EVENTS



**World Congress on  
Healthcare  
Management System  
(HMSUCG)**

06-08 April  
**Dubai**



**International  
Conference on  
Medical, Pharma-  
ceutical & Health  
Sciences (ICMPH)**

13-14 April  
**Dubai**



**4th Global Conference  
on Pharma Industry  
and Medical Devices  
(GCPIMD)**

19-20 April  
**Dubai**



**World Congress on  
Patient Safety and  
Quality Health Care**

21-22 April  
**Abu Dhabi**



**International  
Conference on  
Physical & Life  
Sciences (ICPLS)**

09-10 May  
**Dubai**



**Menas Leading  
Well Intervention  
Conference  
(OWI MENA)**

25-26 May  
**Abu Dhabi**



**Emirates Plastic  
Surgery Congress  
(EPSC)**

27-29 May  
**Dubai**





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- 10Ft (or 2 LD3) ULD dollies. Cooling range -18°C/ +25°C
- Bulk trailers 2500Kg / 14m<sup>3</sup> capacity. Cooling range 0°C/ +18°C







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