WHAT'S INSIDE NEWS, RESEARCH, EXPERT OPINION, REPORTS, AND MORE

The Journal of mHealth

The Global Voice of Digital Health

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HI The Real Impact on Healthcare

ANNOUNCING

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INSIGHT

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Get real-world user insight & analytics for your health technology

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Welcome



IT'S BACK!! What better way to start the year than to celebrate healthcare innovation from around the world with the first official announcement of our 2020 Global Digital Health 100!

Now in its sixth year, our annual Global Digital Health 100 is one of the HealthTech industry's foremost technology award programmes, celebrating innovation and entrepreneurship. It recognises and supports health technology companies that are demonstrating the greatest potential to change the way that healthcare is delivered.

Providing valuable insight on emerging technology trends from across the healthcare continuum, the Global Digital Health 100 has consistently identified early-stage solution providers that have gone on to become some of the world's most successful health technology companies, including: Babylon Health, SilverCloud Health, One Medical, and Butterfly Network - making it an essential resource for industry professionals and investors alike.

Here, as we publish the full list of this year's honourees, we would like to take this opportunity to congratulate all the companies on this year's list. We are proud to support the growth and success of this thriving industry by shining a light on the fantastic work that these technology-providers are doing to advance healthcare innovation.

Also, as we start the year the hype around Artificial Intelligence in healthcare continues to be a hot topic across the industry. In this issue, we include a range of content that aims to understand the real impact that AI and machine learning solutions are having on the medical profession.

With 75 per cent of healthcare enterprises planning to execute an AI strategy next year, there's a great opportunity to further unleash its potential, and in the article Visions of Healthcare AI in 2020 we get the opinions of six experts from leading healthcare organisations including Brainomix, AiCure, Nuance Communications, iRhythm Technologies, Cambridge Cognition and Zebra Medical Vision, as they share their views on what 2020 holds for the industry.

Also inside, Butterfly iQ is the first handheld whole-body ultrasound system. Powered by a single silicon chip on a portable, smartphone-connected device, Butterfly makes point of care ultrasound (POCUS) as accessible as a stethoscope. We talk to Dr. John Martin, Chief Medical Officer at Butterfly Network, about the potential impact of its Butterfly iQ device.

Matthew Driver

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the Global Digital Health

What better way to start the year than to celebrate healthcare innovation from around the world, with the announcement of our 2020 Global Digital Health 100!

Now in its sixth year, our annual Global Digital Health 100 is one of the Health-Tech industry's foremost technology award programmes, celebrating innovation and entrepreneurship. It recognises and supports health technology companies that are demonstrating the greatest potential to change the way that healthcare is delivered.

Recognising Innovation and Emerging Technologies in Healthcare

Providing valuable insight on emerging technology trends from across the healthcare continuum, the Global Digital Health 100 has consistently identified early-stage solution providers that have gone on to become some of the world's most successful health technology companies, including: Babylon Health, SilverCloud Health, One Medical, and Butterfly Network - making it an essential resource for industry professionals and investors alike.

The diversity of this year's list stands out immediately, with new entrants from all sides of the technology spectrum, targeting just about every corner of healthcare. The honouree companies offer technologies across a range of categories including; clinical solutions, wearable technologies, healthcare applications, medical devices, virtual reality and data analytics.

Emerging Trends in Health Technology

One of biggest trends from this year's 100 is the growing adoption of data-led services across nearly all facets of healthcare. From automating critical, but repetitive, tasks for clinicians to speeding up disease diagnosis, the growing application of artificial intelligence and machine learning techniques across healthcare represents a maturing industry. Increasingly, these technologies are seen as go-to tools for supporting care provision and for automating common and high value administrative functions such as patient scheduling and clinician record transcription.

Diagnostic support and clinical guidance are another area of growth seen in this year's list. Improvements to health data access is fuelling a growing cohort of providers looking to tackle disease recognition and identify improved treatment opportunities through data-driven techniques.

Digital Therapeutics also feature heavily in this year's list, as the impact of these solutions start to be truly realised. Scalable programmes across many different disease classes such as mental health and diabetes are delivering results for patients that are comparable to, or exceed, their pharmacological counterparts, providing a viable and effective treatment alternative.

Commenting on the announcement Matthew Driver, Editor-in-Chief at The Journal of mHealth, said: "The Global Digital Health 100 recognises and celebrates the companies and technology leaders within the industry that are raising the bar and shaping the future of healthcare delivery. We are proud to support the growth and success of this thriving technology industry which is being led by the honourees of these awards."

"As a leading publication in Europe and North America The Journal of mHealth gains a unique perspective from our relationship with emerging health technology markets around the World. This enables us to bring one of the most comprehensive lists of technology providers who are representative of the latest technology trends from across the healthcare industry."

Identifying the 100

The Global Digital Health 100 represents months of analysis by the editorial and advisory team at The Journal of mHealth, who considered the offerings and innovations from companies across the HealthTech ecosystem.

The judging criteria analysed 10 different quantitative and qualitative evaluation metrics including: disruptive impact; proof of concept; technology innovation; social value; effectiveness; execution of strategy; and, industry integration. The selected 100 companies demonstrate true innovation and the opportunity to disrupt the delivery of healthcare at scale.

Find out more

View the full 2020 Global Digital Health 100 Award List at *www.thejournalofmhealth.com/digital-health-100.*



The 2020 Global Digital Health 100 List

Company Name	Website	Company Name	Website
Accumbo	accumbo.se	Cognoa	cognoa.com
Activ8lives (Aseptika)	activ8rlives.com	CoHealth	cohealthapp.com
Acuity Link	acuity-link.net	Curve Tomorrow	curevtomorrow.com.au
Ada Health	ada.com	dacadoo	dacadoo.com
Advanced ICU Care	advancedicucare.com	Datica	datica.com
AiCure	aicure.com	Diabetes Digital Media	ddm.health
AlayaCare	alayacare.com	DocDoc	docdoc.com.sg
Analytics 4 Life	analytics4life.com	Doctor On Demand	doctorondemand.com
Antidote	antidote.me	Doctrin AB	doctrin.se
арруа	appva.com/en	Doximity	doximity.com
axial3D	axial3D.com	EarlySense	earlysense.com
Bardy Diagnostics	bardydx.com	EQL	eql.ai
Beddr	beddrsleep.com	Everdrone AB	everdrone.com
Benevolent Al	benevolent.ai	Flow Neuroscience	flowneuroscience.com
Binah.ai	binah.ai	GetWellNetwork	getwellnetwork.com
Biofourmis	biofourmis.com	Global Kinetics Corporation	globalkineticscorporation.com
Biotts	biotts.com	HeadUp Labs	headuplabs.com
Brainomix	brainomix.com	HealthCursor Group	healthcursor.com
BrightInsight	brightinsight.com	HealthMatch	healthmatch.io
Butterfly iQ	butterflynetwork.com	Health Vector	healthvector.world
Cambridge Cognition	cambridgecognition.com	Healx	healx.io
Castor	castoredc.com	HeartFlow	Heartflow.com
Cera	ceracare.co.uk	Hinge Health	hingehealth.com
Ciox	cioxhealth.com	Holmusk	holmusk.com
Cloudbreak Health	cloudbreak.us	Hy5	hy5.no

The 2020 Global Digital Health 100 List

Company Name	Website	Company Name	Website
Hyland	hyland.com/en/healthcare	Oxehealth	oxehealth.com
I-GP	i-GP.uk	Paige	paige.ai
Inspiren	inspiren.com	PatientWisdom	patientwisdom.com
iPlato	iplato.com	PetalMD	petalmd.com
Isabel Haelthcare	isabelhealthcare.com	Pilloxa	pilloxa.com
Kareo	kareo.com	Propeller Health	propellerhealth.com
KRY	kry.se	Psious	psious.com
Leman Micro Devices	www.leman-micro.com	Push Doctor	pushdoctor.co.uk
Lemon Healthcare	Lemonhealthcare.com	Signant Health	signanthealth.com
LifeBox	lifeboxhealth.com	Siilo	siilo.com
Lifelight (Xim)	lifelight.care	SilverCloud Health	silvercloudhealth.com
LifeWIRE	Lifewiregroup.com	SkinVision	skinvision.com
Living With Ltd	livingwith.health	Smart Meter	smartmetercorporation.com
Lumeon	lumeon.com	SOC Telemed	soctelemed.com
MedAware	medaware.com	Sorrel Medical	sorrelmedical.com
Medial EarlySign	Medial EarlySign	The Big Know	thebigknow.com
Mediktor	mediktor.com	UCARE.AI	ucare.ai
Mindwave	mindwaveventures.com	Ultromics	ultromics.com
MolecuLight	moleculight.com	Unmind	unmind.com
MyLiferaft (Kuradocs)	myliferaft.com	UpHill	uphill.pt
NeuroFlow	neuroflowsolution.com	Vine Health	vinehealth.ai
Newtopia	newtopia.com	Visionable	visionable.com
Now Healthcare Group	nowhealthcaregroup.com	WiFi SPARK	wifispark.com
NuvoAir	nuvoair.com	WoundDesk	wounddesk.com
OODA Health	ooda-health.com	Xealth	xealth.io



The Butterfly Effect The Pocket-sized Ultrasound that's Changing Bedside Diagnosis



Dr. John Martin, Chief Medical Officer at Butterfly Network, talks to The Journal of mHealth about the potential impact of its Butterfly iQ device, which enables low-cost, portable, whole body ultrasound at the point-of-care.

Where do you see the initial opportunities for Butterfly and POCUS?

Peer reviewed Medical journals have published extensively on the benefits of bedside ultrasound. A recent publication in JAMA, by a renowned Cardiologist, goes so far as to suggest it should be included as a routine part of the physical exam. While the movement toward this objective is well underway in many specialties, adoption has been limited by two problems: cost and ease of use. With the introduction of Butterfly iQ, ultrasound technology has been reinvented from the ground up, making medical imaging both affordable and versatile, fueling a movement by all specialties to include bedside ultrasound in care delivery models.

What are some of the main features of the Butterfly device that benefit clinicians?

In short, Butterfly iQ is the first handheld whole-body ultrasound system. Powered by a single silicon chip on a portable, smartphone-connected device, Butterfly makes point of care ultrasound (POCUS) as accessible as a stethoscope. In addition to ease of use, the device is much more affordable than traditional systems, which can cost upwards of £40,000, whereas Butterfly iQ starts at £1699.

Butterfly iQ's ultrasound-on-chip technology allows a single probe to have linear, phased and curved array configurations across the broad spectrum of frequencies needed to scan different parts of the entire body. The result is a whole-body ultrasound system that is unlike any device on the market. Butterfly iQ was cleared by the FDA and CE Mark for 13 indications, making it the broadest clearance ever for a single ultrasound trans-

ducer. For clinicians, this means that they can scan the entire body using one probe, meaning they can diagnose a vast array of conditions faster, and with more ease.

Versatility is so important - many hospital procedures are typically done bedside with a traditional ultrasound system being rolled around from patient to patient. With the limited number of technicians and ultrasound devices available, patients often experience extended hospital stay to complete ordered studies, but with a Butterfly iQ in their pocket, Doctors can perform scans quickly, at the bedside, without having to wait for a large device to be free.

How is the solution changing point-of-care workflows and processes for healthcare providers?

Butterfly iQ's handheld system makes ultrasound as accessible as a stethoscope. With point of care ultrasound, providers can save time in diagnosing patients and begin treatment sooner. Saving time from presentation to treatment improves outcomes, lowers costs and improves physician and patient satisfaction. From before we are born to the later stages of life, for almost every condition, ultrasound can play a vital role. Now it is possible with an affordable, versatile and intuitive device.

The second largest group of physicians purchasing this device in the United States are people in primary care or GPs because they see the value. They don't want to send their patients off for tests and wait for the results, they'd like to get the answers to simple questions in their office right away. That's the most efficient way to deliver care and it's the most cost-effective way.

The technology obviously has the potential to significantly change point-of-care imaging and subsequent treatment pathways - but what are some of the challenges you are facing when it comes to encouraging adoption?

The important thing to be clear on when talking about POCUS and the role of Butterfly iQ is that it is different from comprehensive diagnostic sonography such as radiology ultrasound and echocardiography, and is not trying to replace these in-depth diagnostics scans. The value of the Butterfly iQ is in its accessibility and versatility for routine use of ultrasound at the bedside, the role of which is to ask a binary question, and generate a focused answer, expediting care and diagnosis, as well as improving patient safety.

High end ultrasound systems which have advanced features can provide a different level of imaging are not replaced by handheld systems. Those specialized machines still have an important role to play in healthcare. For Butterfly, the focus at the moment is to greatly expand access to ultrasound, democratizing healthcare and impacting as many lives as possible.

By reducing the cost, and access to POCUS, you are democratizing image-based healthcare, how do you intend to further support this with access to training and image analysis/interpretation?

Any qualified healthcare provider (i.e. physician, paramedic, RN) can be trained to use Butterfly iQ. For support, we have a ded-



Education Platform is a diverse video library of ultrasound education taught by experts on how to acquire images and how to interpret them (*https://cloud.butterflynetwork.com/-/edu*) With an integrated software platform, Butterfly also provides a

seamless connection for professionals to collaborate across the hospital or around the world. According to the World Health Organization, ultrasound is one of two essential medical imaging modalities. However, even in the developed world, price and lack of expertise are barriers that prevent access to ultrasound. By putting ultrasound on a chip and creating an integrated software platform that allows for intuitive collaboration between healthcare professionals - including those in the most remote areas of the world - Butterfly iQ is paving the way for early detection and remote diagnosis of health issues around the world.

Are you seeing an appetite from healthcare organizations to increase training and increase the application of POCUS?

Absolutely. There are a number of doctors across the UK that are working hard to introduce POCUS training. At Dublin's Mater Misericordiae University Hospital, consultant in Emergency Medicine and co-director of Emergency Ultrasound Education, Dr Mcdermott, is using Butterfly iQ to run POCUS training days - attendees have included GPs, physios and emergency physicians, all looking to empower themselves to make rapid, accurate diagnosis of their patients.

Over in Africa, we are working with health charity Bridge to

Health, who are using Butterfly iQ to train clinicians to scan for pneumonia, and obstetric complications.

To what extent can software enhancements like machine learning and AI-enabled image interpretation help make POCUS more mainstream?

One of the biggest challenges with using ultrasound is the complexity and skill required to capture an image that is diagnostically relevant. We address this using novel artificial intelligence tools in Butterfly iQ that shows a scale to help signal when the user has captured a "good" image. Hundreds of thousands of images will have been annotated as "good" or "bad" to help train the complex deep learning algorithms. In addition, we are developing tools to assist in interpretations. An example is bedside cardiac imaging. Once a "good" image is captured, the AI technology will then perform an automated interpretation to compute the ejection fraction. There will then be an opportunity for the user to adjust the automated interpretation and recalculate the ejection fraction.

Butterfly's AI technology has created a drastically simpler system for clinicians to utilize ultrasound in their daily practice, assisting them in finding appropriate views and performing automated assessments. This technology is paired with an integrated software platform that provides a connection for professionals to collaborate across the hospital or around the world. With this, healthcare professionals - including those in the most remote areas of the globe - have access to an imaging device that allows



for remote capture, commentating and assessment.

What does the future look like for Butterfly iQ?

- The technological combination of hardware, cloud and AI will allow data to be continuously fed to our intelligence ecosystem, improving our AI technology rapidly, as more users scan with Butterfly iQ. Every user in the Butterfly community will improve our technology, making our solutions more intuitive and accurate.
- Butterfly is a mission-driven company whose core goal is to democratize healthcare by making medical imaging accessible and affordable to everyone. We have just introduced 10 new compatible Android devices, further democratizing and increasing access to medical imaging.
- Approximately 4.7 billion people are unable to obtain medical imaging in the world. By putting ultrasound on a chip and creating an integrated software platform that allows for intuitive collaboration between healthcare professionals - including those in the most remote areas of the world - Butterfly iQ is paving the way for early detection and remote diagnosis of health issues around the world.
- Ultimately, our system will empower patients to scan themselves, treating their conditions much earlier, or even preventing certain conditions from developing to save the lives of those we love.

Our Vision

With evid.health we are building the most comprehensive global knowledge-base of validated health technology evidence and intelligence

The Intelligence Platform for Health **Technologies**

With a framework of over 40 categories, portfolios on the evid.health platform generate thousands of data points on health technologies and the companies and development teams behind them.

- Increase the trust users have in your solution
- Help build evidence-driven business processes
- Support compliance and regulatory reporting
- Improve corporate governance and market vigilance
- Independently validate and assess market claims



INDUSTRY NEWS

News and Information for **Digital Health Professionals**

Asthma Detection and Management System Reimagined



Precipice Design has revealed results of work with phamracuetical specialist Circassia, to reimagine the NIOX VERO®, a 'gold standard' point-of-care medical device which detects nitric oxide levels, a marker of airway inflammation, in patients' breath, to help diagnose and manage asthma.

Circassia challenged Precipice Design to further develop the established and class leading NIOX VERO® with the aim of offering additional choices to patients and clinicians who are seeking enhancements to the current device which will build on already superior patient usability and clinician efficiency.

Miles Hawley, CEO at Precipice Design, commented: "As a pioneering device in its field of respiratory medicine, the current NIOX VERO® model is widely valued by medical professionals as the gold standard in FeNo testing. Our task was to further enhance the clinical and patient experience, by providing enhanced product and UI features."

Precipice Design worked closely with Circassia's in-house R&D team transforming the existing device to become the NIOX VERO® Plus. The updated product has a new carry handle feature and reworked access to the breathing handle. In addition, the screen is larger, and the UI adapted, offering an enhanced user-friendly experience.

Miles Hawley continued: "During research conducted by our team across Europe, the US and China we iteratively stresstested all physical and digital aspects of the new NIOX VERO® Plus design, enhancing the original device and reimagining the UI. Its virtually wordless design and new 'dashboard' led visual aesthetic has been developed to be used across Circassia's key global markets. Patients and clinicians can choose between universal graphics, such as a balloon, accelerator style gauge or a floating feather, to guide their breathing into the device, further improving patient's and clinician's user experience, demonstrating the impactful new design undertaken by the consultancy."

Pilloxa Pursues European Expansion

Pilloxa has announced that Bonnier Ventures, the venture arm of the Bonnier group, has taken the lead in a USD 1.3 million investment round in the company.

Pilloxa, founded in 2015, tackles poor medical adherence within the clinical studies industry by having developed a patient centric adherence platform consisting of smart hardware, tailored smartphone apps, data visualization and analytics. The Pilloxa platform aims to give individualized support and feedback to the user, to make it easier to take medication in the best way possible. Pilloxa has shown adherence of over 90% in indicative studies (with market averages of 60-65%).

Leading pharmaceutical companies Bayer (cardiovascular) and Sandoz/Novartis (transplantation) already trial the company's services as a new approach to tackling patient non-adherence for drugs in clinical trials and patient support programs. High quality real time data, smart interventions and engaged patients can optimize and speed up clinical trials. In the end, this brings new and improved therapies to the market as well as major cost savings for the society.

"Digital health is one of the key focus areas for Bonnier Ventures. The clinical trial market is of substantial size with great digitalisation potential. Pilloxa, with its data driven solution, tackles one of the industry's major problems. We look forward

World's First AI Health Guidance App in Swahili

The first artificial intelligence-based ("AI") symptom-assessment application to be made available in Swahili has been launched today, unlocking access to health information and advice for more than 100 million people seeking healthcare in East Africa.

The app, developed by Ada Health, combines a world-class medical knowledge database with intelligent reasoning technology to help users understand what might be causing their symptoms, as well as providing localised guidance about what they should do next. In doing so, the app aims to empower patients to make informed decisions about their own health, while also complementing and supporting existing healthcare ser-



vices, doctors, and clinics.

Globally, four billion people - more than



to supporting the team as they expand their customer base." says Dajana Mirborn, Investment Director at Bonnier Ventures.

"Pilloxa is ready to expand outside Scandinavia with this strengthened investor base. Bonnier Ventures is a great fit for us, we both share a deep commitment for making long lasting impact and have a time perspective spanning generations. Pilloxa is now ready to help thousands of patients by delivering a solution creating conditions for the best possible treatments to patients as fast as possible", commented Francesco Mazzotta, CEO Pilloxa.

half the world's population - lack access to basic health services, with the disadvantages of this global health challenge 🗢

often disproportionately experienced by people in low- and middle-income countries. East Africa is a region that is acutely affected by this issue. By offering an AI-powered symptom-assessment medical application in Swahili, a language spoken by over 100 million people across the likes of Tanzania, Kenya, Uganda, Mozambique and Somalia, Ada hopes to significantly improve access to quality health information and advice, particularly for young people and families.

The Swahili version of the Ada app has been developed as part of Ada's Global Health Initiative (GHI), a long-term programme to help address the global shortfall in health workers - expected to be over 12.9 million by 2035 - by combining artificial intelligence, human medical expertise and the power of mobile technology to deliver access to health care and guidance at scale. Ada's partners in developing and localising the app are Fondation Botnar, a Swiss foundation focused on improving the health and wellbeing of young people in low- and-middle-income countries through technology, and the Muhimbili University of Health and Allied Sciences in Dar Es Salaam in Tanzania.

Adapting Ada's AI to East Africa's unique healthcare challenges

Ada has worked with local partners, clinicians and healthcare organisations to ensure that the app is adapted to the linguistic, cultural and medical context in each region.

In particular, developing an AI app which could provide meaningful health

advice to patients in East Africa required overcoming several unique challenges:

- » Linguistic nuances: In East Africa, English is in many cases the primary language of medicine, with doctors trained and taught in English. As a result, many medical and anatomical terms simply do not have direct translations in Swahili, and as is the case in other languages and regions, individual health workers typically develop informal ways of explaining medical conditions or terms to patients. To ensure that the Ada app could be used and understood by both medical professionals and patients alike required crucial collaboration with local partners and experts.
- Adapting to local medical conditions: Ada optimised 160 disease models to ensure that the app would correctly factor in the conditions and symptoms that are more common in Tanzania and East Africa than other parts of the world. This included many maternal and child health issues, chronic heart and mental health-related conditions and infectious diseases like malaria, HIV and diphtheria, tetanus and pertussis that are more prevalent in the region.
- » Integrating with healthcare providers in Tanzania: Ada and its partners are also working closely with communities and health workers in underserved areas, to lay the groundwork with the aim of integrating Ada into the local health ecosystem in the future.

Ada is also working with local communities to conduct in-depth, on the ground research to help identify which individuals can most benefit from Ada, as well as to inform future enhancements and adaptations to the app.

"Four billion people across the world lack access to basic health services, and many countries - including Tanzania, Kenya, Somalia and Mozambique - have fewer than 1 physician per 1,000 people²," said Hila Azadzoy, Managing Director of the Ada Health Global Health Initiative. "Thanks to the widespread adoption of mobile technology, there is a huge opportunity for AI to help tackle this issue by improving access for patients and empowering clinicians to have the greatest possible impact. However, to be truly effective, these technologies must be adapted to the medical, cultural and linguistic conditions in each region. Working closely with Muhimbili University allowed us to do this for our Swahili app and we'll be continuing to partner with local experts in East Africa to identify more ways that we can improve access to healthcare."

"There is a significant healthcare shortage in East Africa and it will be very difficult to address this just by training more health workers and doctors," said Dr. Nahya Salim, Head of Pediatrics at Muhimbili University of Health and Allied Sciences in Dar Es Salaam, Tanzania. "We can solve this problem and make healthcare accessible to every family is by making use of the latest technology. By working with the Ada team to make its app available in Swahili and to adapt it to the medical conditions and symptoms prevalent in this region, we're taking an important step in guiding millions of people towards seeking care."

Clinical Study Could Point to a New Treatment for Depression

The first ever clinical study evaluating combined transcranial direct current stimulation (tDCS) and behaviour therapy could point to a new treatment for depression.

The clinical pilot study is being undertaken by Flow Neuroscience, Europe's first, and only, medically approved, at-home treatment for depression, which comprises a tDCS headset device and behaviour therapy app. The results will help the process of getting the Flow device reimbursed by healthcare providers, including the UK's NHS. The independent study will evaluate how patients with depression respond to Flow's tDCS headset combined with its behaviour therapy app, and be led by leading brain stimulation researcher, Dr Andre Brunoni, associate professor of Psychiatry at the University Hospital of Sao Paulo, Brazil.

To date, tDCS has been shown to reliably improve symptoms of depression. Randomised controlled trials published in the New England Journal of Medicine and the British Journal of Psychiatry showed that tDCS, of the type used by Flow, had a similar impact to antidepressants, with fewer, less-severe side effects.

People with depression often have a lower neural activity in their dorsolateral prefrontal cortex, the brain region that controls cognitive skills and emotional expression. The Flow headset, which retails at £399 and can be purchased here, uses tDCS to activate neurons in this area and rebalance activity.

Dr Andre Brunoni, who co-authored the New England Journal of Medicine and British Journal of Psychiatry study, says: "Flow has created a powerful medical device treatment for depression without the adverse effects associated with pharmacological therapies. This new clinical study will, for the first time, evaluate how patients with depression respond to Flow's tDCS headset combined with its behaviour therapy app."

In Europe, Flow is classified as a Class IIa medical device intended for use as a treatment for depression and was certified by BSI's Netherlands notified body.

"We're empowering people to self-manage their depression with safe, effective and medication-free digital alternatives," says Daniel Mansson, CEO and co-founder at Flow. "This is the first

Investment Supports Combinostics to Scale Technology for Early Alzheimer's Diagnosis

Finnish health tech pioneer Combinostics has announced the closure of a \in 3.9M series A funding round that will see the company scale its platform for early-stage Alzheimer's diagnosis to the US and Asia. The round was jointly-led by Industrifonden and NordicNinja VC, with Combinostics representing Nordic-Ninja's fifth deep tech investment over the past 6 months.

"I would like to thank Industrifonden and NordicNinja for demonstrating their trust in Combinostics with this investment, as well as our previous early-stage angel investors," said Combinostics CEO Lennart Thurfjell. "Industrifonden has a proven track record for supporting companies throughout their journeys, and NordicNinja has strong ties with Asia - Japan in particular a very important target market for our technology. We will use this investment to ramp up R&D, build our US operations, and expand in Asia. We currently have a partner working on regulatory approval in Japan, and we are looking for a partner in China."

There are no effective treatments for neurodegenerative diseases like Alzheimer's, but early-stage diagnosis combined with symptomatic treatment and lifestyle intervention can make a drastic difference to quality of life in later years. A vast amount of heterogeneous data is collected during the diagnostic workup, so it can be challenging for healthcare professionals to interpret and identify relationships that exist between different data sets. Combinostics provides an intuitive and holistic view of the



clinical study to examine the full effect of a combined tDCS and behaviour therapy treatment - and the results will help the process of getting Flow reimbursed by healthcare providers, including the UK's NHS."

In October, Flow announced a partnership with leading Harley Street psychology and psychiatry clinics to offer patients the tDCS headset and behaviour therapy app to treat depression.



patient's data, highlighting important relationships early on and supporting early diagnosis.

"Our investment in Combinostics represents another step for our long-term commitment to health tech innovation. The company joins a family of startups that are improving health outcomes globally by building category-leading products," said Industrifonden Investment Manager Patrik Sobocki.

"Combinostics has built a product platform from cutting-edge research that will enhance neurology departments worldwide," he continued. "Their platform supports improved diagnostic accuracy and treatment choice by combining all relevant ⇔ biomarkers with advanced brain image quantification, leading to improved health in neurology patients."

"Combinostics has built an amazing platform that supports doctors in holistically making diagnostic decisions that will significantly help patients in later life, and I believe that such platform is needed in aging societies such as those found in the Nordics and Japan," said NordicNinja VC Managing Partner Shinichi Nikkuni. "They have a great team with the capability to build further traction on top of their already-solid partnership base. We're happy to join their journey and help push them further," said NordicNinja VC Managing Partner Marek Kiisa.

Ultromics Receives FDA Clearance for EchoGo Core Decision Support System

Ultromics, the UK-based health technology firm at the forefront of applying artificial intelligence to echocardiography, has received 510(K) clearance from the U.S. Food and Drug Administration (FDA) for its image analysis system, EchoGo Core.

The clearance is a major milestone for Ultromics and enables the business to make EchoGo available to clinicians and healthcare providers in the US. EchoGo applies artificial intelligence (AI) to automate the analysis and quantification of ultrasound-based heart scans.

Ross Upton, founder and CEO of Ultromics, said, "This is an incredibly exciting step towards the future of healthcare, EchoGo will help clinicians make more accurate and informed decisions to improve patient care delivery. It's truly a watershed moment for Ultromics".

EchoGo has been years in development, from the first trial being set-up in 2011 to Ultromics spinning out of the University of Oxford in 2017, and now achieving FDA clearance. The next stage of growth is commercializing the product and making it available to clinicians.

Traditionally, echocardiography has relied on the expert eye of clinicians, with years of experience, measuring the anatomical structures and identifying the disease, a potentially time-consuming and highly variable process. By automating the process and applying its AI analysis to look in greater detail at the scans, EchoGo enables clinicians to interpret echocardiograms efficiently and accurately and assists in their decision-making.



EchoGo uses AI to calculate left ventricular ejection fraction (EF), the most frequently used measurement of heart function, left ventricular volumes (LV) and, for the first time for an AI application, automated cardiac strain.

Mr. Upton continues, "Strain has shown to be very valuable in cardiovascular diagnostics and has been demonstrated in published studies to be linked with earlier detection of disease and improved patient outcomes. Ultromics' will be the first to use artificial intelligence for automated strain analysis which is applicable to 60 million scans per year. Crucially, strain is also becoming reimbursable from January 2020 in the U.S. EchoGo allows clinicians across a wide range of experience to rapidly obtain accurate and repeatable calculations of strain parameters, assisting them in interpretation of echocardiograms".

"We have more developments planned in 2020, including EchoGo Pro. It will be the first AI system able to predict cardiac disease from echocardiography. We are also planning to expand into other geographic regions including Europe and Asia. Our goal is to improve patient outcomes through earlier detection of cardiac disease."

Ultromics has partnerships with leading cardiology clinical centres in the United States and 30 NHS centres in the UK. Through this, it is continuously optimizing its scanning algorithms by analyzing the archive of scans held by these centres. The pipeline of AI algorithms underpinning EchoGo was built using thousands of images from a carefully curated dataset, from one of the largest echo studies of its kind.

EchoGo is a vendor-neutral platform, which harmoniously integrates into the medical imaging environment, seamlessly providing clinicians with results as part of their routine diagnostic workflow. This ensures fast, efficient and accurate AI-assisted echocardiogram analysis, to enable the highest quality patient care in healthcare institutions globally.

Device Works the Mental Muscle to Naturally Enhance Sleep

Following four years of development and an initial year-long beta program, URGOTECH has announced the final features and commercial availability of its ground breaking device -URGOnight. Leveraging neurofeedback therapy, it is the world's first daytime sleep training system that trains the brain to produce the brainwaves clinically associated with sleep.

Comprised of a wearable Electroencephalogram (EEG)-headband and app, it helps people naturally learn to increase the brainwaves that impact sleep, using technology that has been clinically proven to help people to fall asleep 40% faster and cut nighttime interruptions by half.

The Science of Sleep

Neurofeedback therapies use real-time displays of brain activity, audio and visual cues and reward strategies to teach people to identify and modify behavior to influence a desired outcome. They are used to treat and manage conditions such as sleep, ADHD, improve critical thinking, athletic capabilities and even musical performances. Until now, they are carried out in a clinical environment with medical professionals, however for the first time, URGOnight brings this medical-grade capability into the home.

During the night, our brains emit waves known as "sleep spindles" that control multiple aspects of sleep including how fast we fall asleep, progress through various sleep cycles and how sleep is protected from environmental disturbances such as sounds. The frequency of Sleep Spindles can be increased in the unconscious brain by increasing the frequency of sensorimotor rhythm (SMR) brainwaves we produce during the day. It is these SMR waves URGO-night is able to detect and people can learn to control, leading to better sleep by increasing the speed at which people fall asleep and reducing the number of times they wake up during the night.

How It Works

Worn and used during the day, rather than at night, the adjustable headband is easy and comfortable to wear and uses sophisticated sensors to measure brainwave activity. Advanced hardware and software engineering were needed to transform a traditional EEG system, which is typically large, cumbersome and comprised of multichannel (typically 8) using multiple wet electrodes, into an aesthetically pleasing and comfortable headband people would want to wear.

Allscripts Partners with Myndyou to Triage High-risk Patients

MyndYou has partnered with Allscripts to make the MyndYou triaging and care management solution available to Allscripts clients, reducing the risk of hospitalisation for patients worldwide.

The partnership will enable the passive monitoring of cognitive change as a



The system is designed to be used 20 minutes a day, three times a week. People place the headband comfortably over their head and connect it to the dedicated iOS and Android app. Within the app, users can see their brainwaves in real-time before they start the dedicated 20-minute brain training exercises.

The sleep training programs consist of playful exercises inspired by various themes. Within the games, users are assigned tasks (that are triggered when SMR waves are produced) and see their results, scores and in real-time. There are several themes to choose from with tasks ranging from growing leaves on trees, herding jellyfish and drawing relaxing patterns.

The app also allows users to access stats and achievements and share successes and progresses on social media. A virtual coach in the app guides them throughout their journey, explaining the exercises and providing advice on improving scores. Programs continually adjust to the individual user to ensure their brains are in a constant learning curve and results continue to improve over time. With just minutes a day, people begin to see results after 10-15 sessions and sustainable results after 40 sessions.

"Just as you can train your body to run faster, jump higher, swim further or become more flexible, clinical studies have shown neurofeedback therapy can help people learn how to improve the quality of their sleep," said Guirec Le Lous, Founder of URGO-TECH, the company behind URGONight. "The technology has been used in clinical sleep centers around the world for decades and now with URGOnight, we are making it more fun and accessible and conveniently usable in the comfort of the home."

> proxy for identifying health risks among patients in their home settings and proactively intervene to help prevent hospitalization.

How it works

Utilizing passively collected voice and daily-activity data, MyndYou's unique Cognitive Complexity Analysis detects subtle changes in cognitive and behavioral function, identifying a heightened risk for deterioration or hospitalizations.

MyndYou then elevates this information within the structure of current care management workflows in order to maximize providers' care management potential for the purpose of early and accurate intervention.

Providers will introduce MyndYou's care portal, behavioral monitoring app, and voice bot within their current care management practices as effective methods to scale engagement and optimize triaging for patients most at risk.

"By partnering with MyndYou, we can create additional touchpoints between Allscripts clients and their high-risk patients," said Tina Joros, General Manager - Open Business Unit, Allscripts. "MyndYou's cognitive-driven solution empowers care management teams to reduce hospitalizations and achieve improved outcomes by passively and precisely identifying those in need of extra attention at the right time."

MyndYou Features:

» MyndYou App: A passive behavioral monitoring app that detects changes



in behavioral function (such as walking, driving, voice, and sleep) and raises flags to healthcare professionals upon identification of subtle changes that can signal a heightened risk of hospitalization or deterioration.

- MyndYou virtual care manager, Eleanor: Automated, personalized voice bot calls directly to the patient's phone using targeted questionnaires aimed to retrieve important information regarding the health and safety status of highrisk clients, with highlighted transcripts elevated to care management teams.
- MyndYou Care Portal: a dynamic dash-

board for care professionals that acts as a client management system and remote calling platform, with integrated insights from the voice analyses from MyndYou VoIP and BOT calls, and activity analyses from the MyndYou App.

"Our mission is to scale care and improve the quality of life of older adults by bringing together cutting edge technology with the human touch in order to keep them safe and functioning within their home environments for longer," says Ruth Poliakine Baruchi, CEO and co-founder of MyndYou.

Clinical Network Launches Pioneering AI Stroke Project

Cheshire & Merseyside Strategic Clinical Network (CMSCN) has partnered with connected healthcare specialist Wellbeing Software and stroke imaging company Brainomix to introduce a pioneering AI stroke diagnosis platform across the region.

The Brainomix e-Stroke Suite software has been selected to enable physicians across the CMSCN to more confidently - and crucially - to quickly identify stroke patients when assessing brain scans, enabling them to make informed decisions about the best possible treatment - which could potentially involve transportation from one of the primary stroke centres to the Walton Centre.

The implementation has been made possible by Wellbeing's AI Connect platform, which enables hospitals to embed multiple algorithms into their existing radiology workflow, regardless of the RIS or PACS they're using. It is Wellbeing's market reach and expertise in radiology information systems that is enabling the rapid adoption and optimisation of AI in the UK.

Brainomix's e-Stroke Suite solution assists healthcare professionals to make faster, more informed decisions by applying Artificial Intelligence (AI) when assessing ischemic stroke damage. It interprets scans based on metrics drawn from over 150,000 images and is able to quantify the volume of ischemia as well as the ASPECTS score, providing a standardised stroke diagnosis quicker.

Chris Yeowart, Director at Wellbeing Software said: "Our customers have indicated a demand for AI in radiology to support clini-



cal decision making and to improve patient outcomes. However, in order to optimise the user experience, and to maximise clinical advantage, these algorithms need to be integrated into existing workflow. Our role is to collaborate with market-leading vendors like Brainomix to support the introduction of AI to the NHS, and we're excited to be part of this innovative project with CMSCN."

Riaz Rahman, VP Healthcare Global at Brainomix, said: "We are delighted to partner with Wellbeing Software and the CAM stroke network to deliver a truly transformative program. By seamlessly connecting each of the sites across the full stroke network, we will provide frontline stroke physicians with fast and critical clinical information to optimise treatment decisions in what is a highly time sensitive pathway."

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Dr Nikhil Sharma, Clinical Director, Cheshire & Mersey Stroke Strategic Clinical Network said: "We're excited to be introducing Brainomix software in Cheshire and Mersey. The AI software will transform our ability to reliably and confidently interpret CT angiograms as we roll out the out-of-hours thrombectomy service. In addition, the CT perfusion software will enable more patients than ever to access vital reperfusion therapies. This will have a huge lifesaving and disability-reducing impact for our patients."

The network consists of six primary stroke centres; Southport & Ormskirk, Aintree, The Royal Liverpool, Whiston, Arrowe Park, and The Countess of Chester, all of which link up to The Walton Centre where patients who require mechanical thrombectomy may be referred/transported for treatment.

Upcoming events

March 2020



San Francisco, CA, USA For more information visit: https://www.TriConference.com



Medical Imaging Convention

TRI-CON

Birmingham, UK For more information visit http://www.imagingconvention.com



Oncology Convention

Birmingham, UK For more information visit http://www.oncologyconvention.com

Digital Health Rewired

London, UK For more information visit https://www.digitalhealthrewired.com



European Neuro Convention

Birmingham, UK For more information visit http://www.neuroconvention.com

SEHTA International MedTech

London, UK For more information visit https://www.sehtamedtechexpo.co.uk

April 2020



Emergency Show

London, UK For more information visit www.emergencyshow.london

June 2020

MedFIT



Grenoble, France For more information visit https://www.medfit-event.com

How Digital Technologies and Al are Changing Healthcare

By Katie Gilsenan, Senior Trends Analyst, GlobalWebIndex

In the near future, having an appointment with your doctor online will become as normal as making a payment on an app or booking a taxi through Uber.

Disruptive technologies like Artificial Intelligence (AI) and telehealth, along with tech giants like Amazon, Apple, and Google, are changing the face of healthcare as we know it.

According to the World Health Organisation, global healthcare spending reached \$7.5 trillion in 2016, representing 10% of global GDP. Growing and aging populations, as well as an increase in chronic diseases are among some of the biggest contributors to these rising costs and as a result, hospitals and physicians are under immense strain.

This is where technological advancements could potentially alleviate some of the problems affecting the healthcare industry, particularly when it comes to creating greater efficiencies across the board.

It's time to take control of our health

Consumers are increasingly expecting the same digital experience in all aspects of their lives. We're able to use our mobile phones for banking and shop online without stepping outside our front door, so why should healthcare be any different?

With healthcare spending on the rise, it's now more important than ever to empower consumers to manage their own health. Our global research reveals 36% of consumers are using the internet to research health issues and healthcare products, jumping up to 42% for users aged 55-64, where a focus on health becomes even more crucial.

What's really exciting is consumers are eager to embrace change and new technologies. In the U.S. and UK, half of consumers say the ability to consult with a doctor by a phone or video call instead of in-per-



son would help them manage their healthcare more effectively, showing there's great appetite for digital appointments. With digital health services, consumers don't have to wait weeks to get an appointment or spend hours in a waiting room and it also helps to free up doctors' time to focus on more urgent cases in-person.

Being able to communicate with doctors digitally is just one piece of the solution though. Over half of consumers say the ability to access their health information online would be beneficial in managing their health. Additionally, around 70% of consumers are happy to have their health data accessible through their smartphone. This requires a shift in how we think about health data. Having a cloud-based, centralized and secure electronic health record could be key in helping consumers actively engage in their own wellbeing and provides a sense of reassurance and ownership. On this front, Apple, Google and Microsoft are working toward giving patients access to historical health insurance claims from their devices, providing users with more data portability and choice in how they access their own information.

As with everything, digital health services aren't perfect. One of the potential downsides is it removes the face-to-face, personal interaction a patient has with their doctor. It's clear from our research consumers' first preference for communicating with their doctor in future is still in-person. This highlights that even though digital services will become a core part of healthcare moving forward, the human touch still can't be replaced.

Did someone call for an AI doctor?

With AI and machine learning constantly advancing, areas like early diagnosis, automation of tasks, development of new medicines, and precision surgery are all made possible.

Our research reveals the perceived benefits of AI among consumers in the U.S. and UK are mainly centered around its ability to offer greater preventative care and create efficiencies. While AI has many potential benefits, implementing it also comes with its own set of challenges, and not just from a cost or infrastructural perspective.

For consumers, privacy and security issues are their biggest concern overall (51%). AI and machine learning requires huge amounts of data to learn and improve, so ensuring patient privacy is essential. This is particularly relevant for tech companies like Google and Amazon too. We found that the vast majority of consumers are comfortable sharing their data with their healthcare provider, but this dips significantly for technology firms – 39% of ramping