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

The Journal of mHealth

The Global Voice of Digital Health

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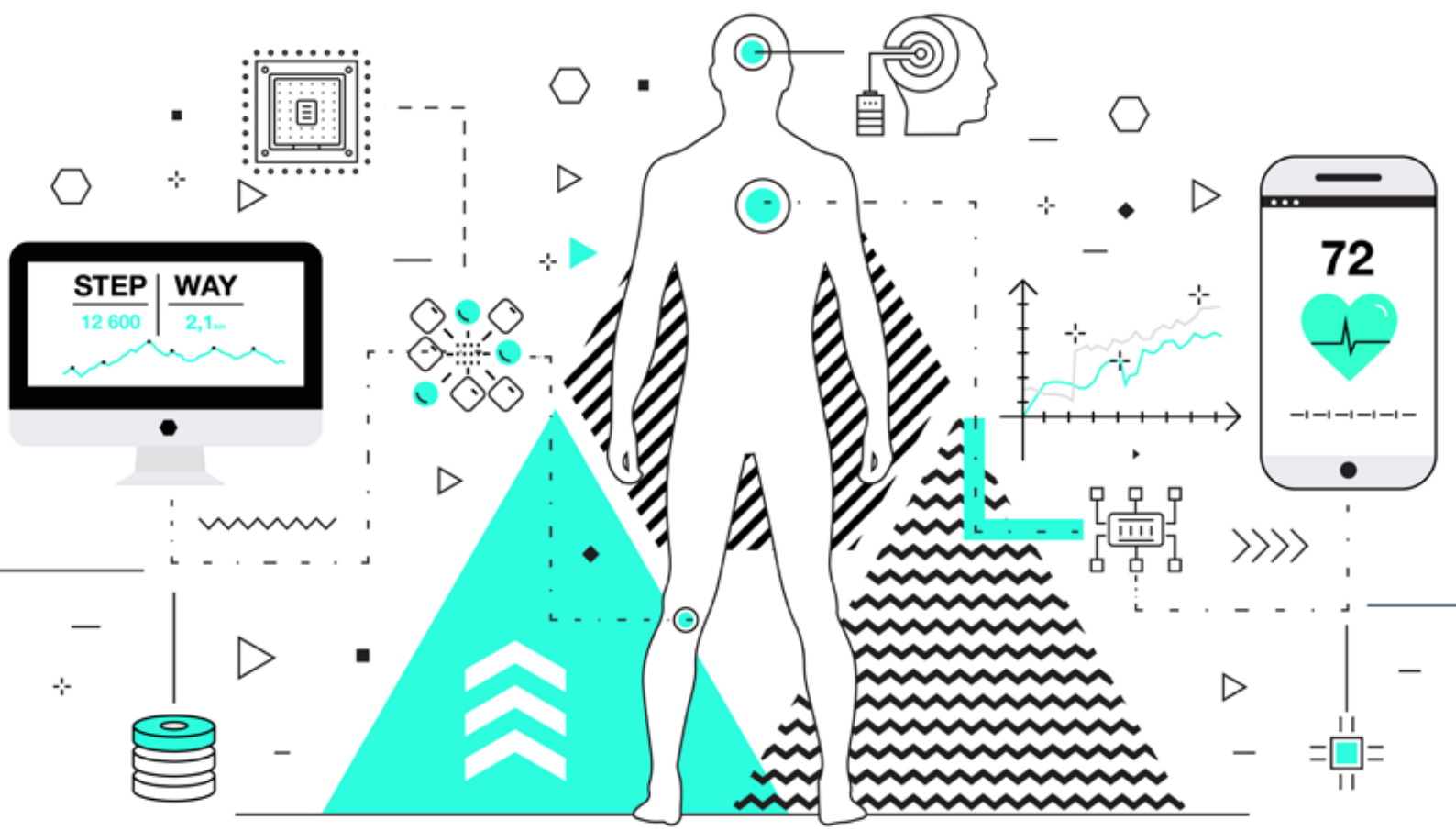

FUTURE OF HealthTech

INSIGHT

2019: The Year Ahead for HealthTech

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Digital Health Global 100 2018

EXPERT OPINION

Role of HealthTech in Mental Health

In This Issue

Welcome

As we kick-start a new year of healthcare technology innovation it is amazing to see the rate at which these solutions are beginning to be adopted and the profound impact that they are starting to have upon the way healthcare is delivered. From consumer health products to clinical solutions, digital technologies are changing the way that we approach healthcare.

Looking back at 2018, certain areas in particular saw stand out growth - It was the year that telehealth became mainstream, particularly in the US, where there has been huge growth in the use of teleconferencing solutions for care delivery. The UK, Europe, Australia and many other regions around the world have also seen telehealth adoption accelerate over the past 12-18 months. This growing acceptance of remote consultations is fuelling new delivery models in many areas of health, but mental health and behavioural change are both areas where we have seen particular development. The increasing number of services offering the opportunity to consult with specialists coupled with a growing acceptance by patients to communicate with their care professionals in this way means that we are beginning to see a whole shift in the market for this type of service provision.

Looking forward to 2019 we ask what might lay ahead for the healthtech market, and in this issue we include a number of features and articles that look to predict what changes we might see in the industry over the next 12-months. In our feature, '*2019: The Year Ahead for HealthTech*' we include an article from David Champeaux, Global Cognitive Health Solutions Leader at IPsoft, titled '*The Year Healthcare Insights Turn into Healthcare Action*'. We also include expert opinion from Ken Cahill, CEO of SilverCloud Health, that suggests '*2019 will Transform How Mental Health Care is Delivered*'.

Evidence in health technology will be a big topic for 2019 and in our next issue (March/April) we will be focussing on the growing need for solution providers to embed evidence at the heart of their whole enterprise strategy, and the impact that, that will have on the wider market.

On the theme of technology changing healthcare, we recently announced our annual Global Digital Health 100 award winners and in this issue we are pleased to bring you the full 2018 list of honourees in full. Over the past five years, the Global Digital Health 100 has become established as an international benchmark of innovation in the healthcare technology industry, and it is fantastic to see so many new entrants from all sides of the HealthTech spectrum, from new innovators looking to apply technologies like artificial intelligence and virtual/augmented reality to healthcare, to solution providers who are demonstrating rapid growth in more established tech-led services like telehealth, digital therapeutics and behavioural change programmes.

The list also provides insight into the key sector trends that we are beginning to see emerge from across the healthcare continuum when it comes to the adoption of technology-led products and services. See the full Global Digital Health 100 on page 4 and find out more about the recipient companies at *thejournalofmhealth.com/digital-health-100*.

Matthew Driver
Editor

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Editor: Matthew Driver
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For editorial, research and paper submissions, and advertising opportunities please contact:
Matthew Driver
matthew@simedics.org
+44 (0) 1756 709605

Subscribe at
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Contact Us

Talk to us on: +44 (0) 1756 709605
Email: enquiries@thejournalofmhealth.com
Visit: www.thejournalofmhealth.com

Matthew Driver
Managing Editor
matthew@simedics.org

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submissions@thejournalofmhealth.com

Announcing the Global Digital Health 100

Recognising Innovation and Entrepeneurship in Health Technology

Technology across the healthcare industry is having a profound impact upon so many different facets of delivery and health management. Recent years have seen the pace of HealthTech adoption accelerate as the many benefits of introducing technology-led products and services begins to be realised.

Our Global Digital Health 100 is one of the HealthTech industries 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.

This year's 100 sees many new entrants from all sides of the HealthTech spectrum, from new innovators looking to apply technologies like artificial intelligence and virtual/augmented reality to healthcare, to solution providers who are demonstrating rapid growth in more established tech-led services like telehealth, digital therapeutics and behavioural change programmes.

From across the Health Continuum

The diversity of this year's list stands out immediately. With innovations 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. These are all solutions and services that are transforming, or have the potential to transform, and disrupt the way in which healthcare is delivered.

The list also provides insight into the key sector trends that we are beginning to see emerge from across the healthcare continuum when it comes to the adoption of technology-led products and services.

Delivering Technology-led Services at Scale

One of the most profound differences identifiable in this year's cohort is the number of technology providers who are delivering their solutions at scale. In past years, many of our featured technologies have been limited by their relatively small user groups, but as the healthcare technology market continues to mature we are now beginning to see more and more solutions that are successfully delivering these technology-driven modalities to much larger user bases.

Certain areas in particular saw stand out growth during 2018, including: Technology-delivered mental health treatment; diabetes tech; data-led disease management; telehealth; and behavioural change therapies.

Identifying the 100

The Global Digital Health 100 represents 6 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. The selection criteria ensure that companies are considered truly upon innovation, allowing start-up offerings to be compared alongside established and larger organisations.

Find out more

View the full 2018 Global Digital Health 100 Award List at *www.thejournalofmhealth.com/digital-health-100.* ■

The 2018 Global Digital Health 100 List

Company Name	Website
Acuity Link	www.acuity-link.net/
Ada	ada.com
AdhereTech	adheretech.com
Advanced ICU Care	advancedicucare.com
Babylon Health	babylonhealth.com
Backpack	backpackhealth.com
Bay Labs	baylabs.io
Bigfoot Biomedical	bigfootbiomedical.com
BlueMed	bluemed.nl
BraveHeart Wireless	braveheart.life
Bruin Biometrics (BBI)	bruinbiometrics.com
Butterfly IQ	butterflynetwork.com
Care Angel	careangel.com
Careband	careband.co
Changing Health	changinghealth.com
Clinical Design	clinical.design
Cloudbreak Health	cloudbreak.us
Coala Life AB	coalalife.ccom
CoHealth	cohealthapp.com
Commontime	commontime.com
Congenica	congenica.com
corti	corti.ai
diagnostics.ai	diagnostics.ai
DocDoc	docdoc.com
docprime	docprime.com
Doctor On Demand	docotrondemand.com
Doximity	doximity.com
DrChrono	drchrono.com
EarlySense	earlysense.com
eHealth Africa	ehealthafrica.org
Electronic Caregiver (SDS)	electroniccaregiver.com
emocha	emocha.com
ERT	ert.com
Fitbit	fitbit.com
FollowApp.Care	www.followapp.care
Form Labs	formlabs.com
Forward Health	forwardhealth.co
Freestyle Libre (Abbott)	freestylelibre.co.uk
Full Health	fullhealthmedical.com
Genetesis	genetesis.com
Genomtec S.A.	genomtec.com
Glyconics	www.glyconics.com
HeartFlow	www.heartflow.com
Healios	healios.org.uk
Ieso	iesohealth.com
i-GP	i-GP.uk
Inhealthcare	inhealthcare.co.uk
inMotion VR	inmotionvr.com
InterSystems	intersystems.com
IOMED Medical Solutions	iomed.es

The 2018 Global Digital Health 100 List

Company Name	Website
Karify	karify.com
K Health	khealth.ai
Kaia Health	kaiahealth.com
Liva Healthcare	livahealthcare.com
LumiraDx Care Solutions	lumiradxcaresolutions.com
Lunit	lunit.io
Medbelle	medbelle.com
Medic Mobile	medicmobile.org
Mediktor	mediktor.com
Medit	medit.online
Medivizor	medivizor.com
Medopad	medopad.com
Medumo	medumo.com
Memoride	memoride.eu
Memory Tracks	memorytracks.co.uk
MIRA Rehab	mirarehab.com
Min Doktor	mindoktor.se
Nervecentre Software	nervecentresoftware.com
NeuroMetrix	www.neurometrix.com
OM1	om1.com
Omada	omadahealth.com
OncoPower	oncopower.io
OntarioMD	ontariomd.ca
Oxford VR	www.oxfordvr.org
Oxehealth	oxehealth.com

Company Name	Website
Pattern Health	pattern.health
Ping An Good Doctor (PAGD)	pahtg.com/en
Practice Fusion	practicefusion.com
Propeller Health	www.propellerhealth.com
Psious	psious.com
Qompium (FibriCheck)	fibricheck.com
qure.ai	qure.ai
Remedy Partners	remedypartners.com
Revitalised	revitalised.co.uk
SensDx	sensdx.eu
Sensyne Health	www.sensynehealth.com
SigTuple	sigtuple.com
siilo	siilo.com
SilverCloud Health	silvercloudhealth.com
Smart Meter	smartmetercorporation.com
SnapMD	snap.md
The Garage	thegaragein.com
Tridiuum	tridiuum.com
uMotif	umotif.com
Vezeeta	vezeeta.com
Virta	virtahealth.com
VivaLNK	vivalnk.com
Viz.ai	viz.ai
VRHealth	xr.health
Widex	widex.com

Healthcare Cybersecurity

The Challenges of Delivering Secure Solutions on a Global Scale

In this interview we talk to Michael McNeil, Head of Product Security & Services for Philips about some of the challenges involved with securing healthcare technologies on a global scale.

What are some of the unique security challenges Philips faces as a global healthcare technology provider?

Across all of our solutions, whether it is a Sonicare toothbrush or a complex healthcare clinical informatics solution, we try to ensure that we implement a certain level of standards from a security perspective. This is because we face a number of similar challenges irrespective of the technology in question.

One of the major challenges implicated is the development of interconnected systems, where in a lot of cases the core technology was originally designed and implemented without that intention in mind. The need for digitalisation and for healthcare delivery systems to reduce their overall costs, coupled with the fact that you are now transmitting information and data to the cloud and across the globe, exponentially increases the number of threats and risk factors that we have to consider.

Globally at Philips, we need to ensure that when we are developing our systems they meet a set of standards and responsibilities that come from regulatory bodies and the wider healthcare ecosystem. It is important therefore that we fully understand and meet those regulatory requirements so that we can harmonise our approach to these across the globe. Not only this, we face challenges in looking at our existing products and technology and making sure that we can develop it to a competency whereby it is much more resilient from a cyber perspective.

What are some of the main factors driving the increase in the number of threats facing healthcare systems?

If you think about the healthcare continuum as an industry it is currently about ten-years behind other industries, such as the financial services. As a result, you still have many of the basic problems that can lead to weaknesses within a system and it is when those weaknesses are able to proliferate that you see threats emerging.

In the past, the connectivity across the healthcare ecosystem has not been as abound, and as apparent, as is required today. Traditionally, when systems were sold into healthcare organisations they would be designed to fit behind that organisation's network and infrastructure, operating within that entity alone. Systems would not be connected and therefore not required to exchange information and data with any other entities: this standalone approach would have been central to the design of that system. Therefore, it is complicated to equip certain architectures that weren't originally aligned for being connected in a particular way, and connect them to other systems - it can result in certain vulnerabilities. This can then present a target rich environment for possible intrusion.

When you look at the value of health data and the level of personal information that is available in health records then you can see how potentially lucrative accessing this type of information can be, and that is also having a significant impact on the where the threats are coming from.

With solutions that touch so many facets of healthcare delivery how do you manage the needs of so many different users, whilst maintaining secure environments?

What we critically do is assess regulatory requirements, the requirements of our customers and what our best practices are from a standards perspective to come up with a series of requirements that need to be met. Based upon these sets of requirements we will develop our solutions. For us, this gives us a way to market through a security-by-design principle. By having these standards we can harmonise the way we design products and solutions - for example, our development process will have static and dynamic testing as a part of every release. Integrating this testing rigour alongside security risk assessments gives us the ability to have a better understanding, from a customer's perspective, of how to deploy solutions. Thus we can ensure that upon deployment in a customer's environment, we can alert them to the most secure ways for development.

There are times when some of the basics can be forgotten. So, when we look at security-by-design we not only look at different types of standards and recommendations but we also ensure that at the very core of what is being done we try and address some of, what I call, the 'deadly-sins'. These include looking at factors like: The way that we deal with passwords; having installed authentication protocols within our solutions, along with the appropriate permissions management; and, multi-factor authentication. These are all factors that will help increase the overall security.

Likewise when we look at data and information of value then that is when encryption really comes into play. Especially, when we look at encryption of sensitive data like personally identifiable and personal health information - whether it is in transit, or if it is at rest, we put a high-premium on making sure that encryption algorithms are a central part of a solution.

Making sure that across all Philips environments, there is a consistent approach towards updating solutions allows us to be vigilant on behalf of our customers. We can continue to patch, update and upgrade their solutions to the most current areas, because having a current system in place means that viruses, potential malware, or other vulnerabilities that can affect a system will be avoided.

To what extent are your approaches to system security reactive or proactive?

It is a combination. Like other manufacturers, we have a number of legacy products and solutions and so we are not immune to the problems caused by legacy operating systems and algorithms. Managing that environment is very challenging and it is very reactive. When you try to get customers to migrate away from some of their older systems the cost pressures on healthcare organisations can make that process difficult.

When we are looking at putting new solutions into these environments then we have much proactive monitoring standards that can help us to mitigate some of the threats.

Philips is involved in a number of standards bodies and we work with regulators and other government entities. Personally, I have testified in the US before Congress in relation to cyber security in healthcare as a subject expert. Steps like these help us to move this topic and take the initiative from a proactive position. In turn, this helps to establish and proliferate some of these best practices across other manufacturers in the industry through taking a leadership role in this area.

Philips was one of the first organisations in the medical device manufacturing space to establish a core vulnerability disclosure process, at least 2-years before it became a requirement in the United States, when the FDA made it part of their post-market guidance.

Similarly, we were one of the first organisations to adopt communication policies with our customers to ensure that they are informed about potential vulnerabilities and the necessary steps that can be taken to mitigate those threats. In certain areas like our clinical informatics solutions, where we have elements that connect to a customers' infrastructure, we have a much better perspective of the client system, which means that we can more proactively monitor for potential threats. This then provides us with greater opportunity to implement effective change that can be beneficial across the wider network.

How does increased interoperability between systems impact the management of security?

There is recognition across the entire system about the need for interoperability, not just for clinical systems but across the whole organisation. It is understood that systems need to connect not only within a network but outside of the network. As a result, people are much more aware that all it requires is just one weak link or backdoor to allow a threat to get into an environment and take down the entire network infrastructure. Based upon this, you now see a much stronger need for vendor and supplier management programmes. You are beginning to see collaboration all the way through the manufacturing process, with vendors themselves starting to take a much proactive approach towards the management of their own supplier networks. This ensures that there is security-by-design across all aspects of the system development, implementation and management.

As an industry we do need to look at that entire ecosystem with regards to the management process, as a means of helping to deliver secure methods of interoperability.

How are techniques and approaches to data security changing and what can new technologies do to improve these processes?

I think that the same types of technologies that we are implementing in our products and solutions in order to allow them to gather more data and information are starting to be used from a security perspective. When we look at things like threat intelligence and monitoring, or being able to analyse certain parts of our networks and infrastructures as well as those of our customers, these tools give us much greater capabilities to leverage that data and to correlate where we might see potential issues.

It is definitely on our horizon, but because of the lag in the healthcare industry there is still lot of fixing the basics that needs to be consistently put in place, whether it be small, medium or large organisations in the healthcare ecosystem. I do believe that there are very effective technologies and solution-sets that a number of my peers in this environment are taking a very strong look at leveraging, from a security perspective. ■

INDUSTRY NEWS

News and Information for Digital Health Professionals

The World's First Virtual Caregiver™ Ambitious Tech at CES

In January 2019, over 200,000 people from around the world will converge onto the streets of Las Vegas, Nevada for the Consumer Electronics Show.

This year's show promises to debut some of the most advanced new technologies the world has ever seen, and products designed to transform the world, home and workplace. One of the most anticipated and ambitious technologies will be Addison Care™ -- the world's first Virtual Caregiver by electronic caregiver™, a division of SameDay Security, Inc. Noted as Addison's first public appearance, CES will host the labour of love which includes millions of dollars in research and development and creative process spanning 7 years.

Addison Care™ is named after its ambient augmented reality virtual caregiver, Addison. She's a state of the art, 3D animated caregiver designed to engage aging and chronically ill clients throughout the home to supplement their care and to provide various health and safety features. Appearing on 15-inch monitors strategically placed throughout the residence, she carries on two-way conversations, and she is programed for a user's personal needs and plans of care.

Addison's capabilities include 24/7 in-home checkups! Addison monitors your activity, reminds you to take medications and verifies adherence and provides real-time assessments if a client develops evidence of increased risk of falling or

health decline. She measures health performance, rewards her users for making progress, collects vitals and conducts in-home examinations. Addison may just be the technological breakthrough our rapidly aging population needs in order to help them stay in the homes they love at a fraction of the cost.

Anthony Dohrmann is the Founder and CEO of SameDay Security and the visionary behind Addison. "The aging population commonly lives with comorbidities (multiple chronic diseases). Approximately 100M Americans are living with a chronic illness; managing diabetes, respiratory disease, heart disease or other illnesses require follow through and accurate scheduling. There is a lot of pressure for patients and families and adherence to treatment regimens are often difficult to manage at home. Patients are often confused about their care instructions and non-adherence with care plans and medications schedules is estimated to cause 50% of all treatment failures."

"Only 3% of the US population can afford live caregiving," Dohrmann said. "We are bringing affordable, effective care alternatives to the world through Addison. Working with Home Care Providers and Hospitals across America, we will provide service and product line extensions to serve market need, while delivering alternatives individuals and families can afford. Our goal is to cut costs, improve care and extend functional independence."

Why is Addison Care™ so ambitious? The company says Addison requires a complex array of devices, configured for instant and easy implementation, involving technologies such as Bluetooth, cellular, internet, cloud computing, edge Machine Learning processing, complex visual sensing, clinical interfaces, conversational speech, augmented reality, robust security, and a dynamic user interface. The corporation built Addison on AWS, who it credits with providing incredible solutions and the support needed to make Addison possible. ■

Florida Hospitals Go Mobile with Wayfinding

Patients and visitors to BayCare hospitals, in Florida, are now able to use their smart phones to find the destination within the hospital following the launch of BayCare Compass, an indoor mobile wayfinding app that provides "turn by turn" directions to publicly available locations.

BayCare is a leading not-for-profit health care system, in the USA, that connects individuals and families to a wide range of services at 15 hospitals and hundreds of other convenient locations throughout the Tampa Bay and west central Florida regions.

"Our patients and visitors have told us they want better ways to navigate through our hospitals. BayCare Compass gives them the ability to find their way in our hospitals right in the palm of their hand," said Tim Thompson, senior vice president, information services and chief information officer, BayCare.

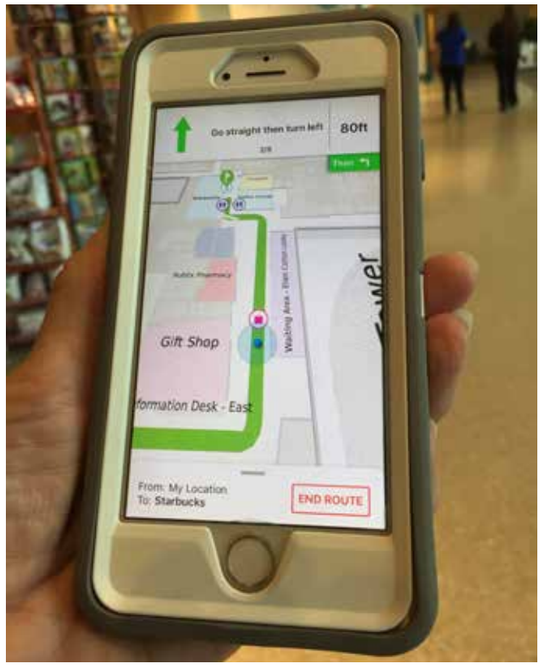
Using a smart phone or tablet and available for free download on the Apple App store or Google Play, BayCare Compass features:

- Detailed maps of publicly available hospital floors
- Directory of publicly available departments and clinics
- Real-time location
- Points of interest around the hospital
- Driving and parking directions

"With BayCare Compass we can engage patients and visitors before they ever leave home," said Thompson. The app offers a parking planner and can provide the option to save the car's location. Upon arrival at a BayCare hospital campus, the app automatically populates with that specific location. All hospital guest services staff are trained on BayCare Compass to assist patients or visitors and a desktop application gives users the opportunity to print out directions before leaving home.

BayCare Compass is powered by Connexient, whose MediNavTM solution has been deployed at major health systems across the country to provide indoor mapping, navigation and location-based services.

BayCare Compass is just one of a series of technology-based solutions BayCare is using to enhance care and improve access.



The solutions include:

- HealthNav, a free mobile app that can help guide people with non-urgent conditions to convenient, quality medical services.
- eCare, an electronic patient monitoring system that uses remote computer monitoring technology to enhance the care of critically ill patients in the hospital intensive care unit (ICU.)
- BayCare Anywhere, a 24/7 non-emergency telemedicine service offering virtual doctor visits through secure, interactive video and audio communications on a smart phone, tablet or computer.
- Telemonitoring of patients in nursing homes or rehabilitation facilities.
- Tablet-based, video-enhanced care for BayCare HomeCare patients in their homes. ■

Smart Wearable Harnesses the Power of Neurostimulation and AI to Attack the Chronic Pain Crisis

NeuroMetrix has unveiled its smartest, smallest and most powerful wearable therapeutic to date. With new features seen for the first time at CES, the recently launched Quell® 2.0 is 50% smaller, yet 20% more powerful than its predecessor. The Company will introduce new functions at CES that include updates to the Quell app like coaching that helps users achieve the best possible outcomes. It also takes Pain Tech to a new level with an "Intensive Therapy" option and is the first wearable technology to utilise machine learning to deliver unprecedented personalization for the treatment of chronic pain.

Named a CES® 2019 Innovation Awards Honoree, in the Fitness, Sports and Biotech product category, Quell is a 100% drug-free system that uses prescription strength nerve-stimulation technology to block chronic pain. Aspiring to be part of the solution to the chronic pain crisis, Quell is designed for multiple types and sources of pain and has been shown in clinical studies to relieve chronic pain.

How It Works

A Class II medical device, Quell® 2.0 is an advanced form of transcutaneous electrical nerve stimulation (TENS). The device is worn on the leg, regardless of the site of pain, and sends neural pulses to the brain that trigger a natural pain relief response in the central nervous system.

Worn in a breathable soft, flexible band, the Quell device has a credit card sized footprint so that it is discreet and comfortable under clothing. Quell 2.0 is powered by a proprietary neurostimulation microchip. It is 50% smaller than the original Quell device, yet it outputs up to 20% more electrical power. Quell technology is up to 10x more powerful than typical OTC TENS devices.[1]

A new "Intensive Therapy" option will be added to Quell 2.0 that delivers intensive nerve stimulation concentrated into a 15-minute session. This therapy option will give Quell users another choice for obtaining pain relief, one that may act faster than standard Quell therapy. No other wearable TENS device has the electrical power to consistently provide Intensive Therapy. The Quell Relief app makes using both Intensive Therapy and Standard Therapy seamless, to achieve the best possible pain relief for each individual.

With a typical battery life of up 25 hours, Quell 2.0 is the only wearable pain device FDA cleared for day and night time use and has been designed for multiple types and sources of chronic pain. After a simple set up, Quell will automatically deliver therapy, and is so smart that it will adapt therapy throughout the day. In a published study, 4 out of 5 users reported improvements in their pain.[2]

PAIN RELIEF UNDER CONTROL

The Quell Relief App has also received a significant upgrade. The newly added Therapy Coach combines goal setting, real-time feedback, educational content, and motivational messages to encourage daily use of Quell to help new users maximise results.

Additionally, its intuitive design allows users to personalise therapy to their individual needs and track progress, including measurable outcomes of success such as reported pain levels and changes in sleep and gait, using the accelerometer in the device.

Unprecedented Personalisation through AI

Quell 2.0 is packed with sophisticated therapeutic intelligence, delivering on the promise of AI. These algorithms are derived from the application of machine learning to millions of data points from over 70,000 chronic pain suffers in the Quell Healthcloud. The process evaluates demographics, health conditions, pain levels and characteristics, device utilisation and objective measures of sleep, activity and gait from Quell users to power truly personalised treatment.

Quell is smart enough to adjust a user's therapy based on manual intensity changes, body position, and sleep movements. Quell can even adapt to changes in the local weather, providing the user alerts and the option to increase dosage if the weather is predicted to change in a way that affects their pain!

Making a Dent in the Opioid Crisis

An estimated 100 million Americans are living with some form of chronic pain, costing an estimated $635 billion per year for treatments and lost economic output. Recent research shows that people living with chronic pain feel stigmatized by the opioid crisis and are looking for alternative treatments. Pain Tech such as Quell has an important role to play in helping people reclaim their life from chronic pain.

"Since first launching Quell in 2015, over 100,000 individuals living with chronic pain have experienced its patented neurotechnology." said Shai N. Gozani, M.D., Ph.D., President and CEO of NeuroMetrix. "The Quell 2.0 device and the new features and technology we are unveiling at CES are a direct result of customer feedback and our latest research. Quell has been designed to offer a long-term solution for chronic pain suffers seeking non-pharmacological pain relief options.

References

1. Comparison to leading OTC TENS devices, based on retail sales data. Maximum sustained energy when used as directed.
2. Journal of Pain Research 2016;(9):469-479. Based on 60 days of product use. Results may vary.
3. NeuroMetrix. (2018). Flipping the Script: Living with Chronic Pain amid the Opioid Epidemic. ■

Innovative Digital Healthcare Partnership to Reduce Back Pain

Sweden's leading digital healthcare provider, Min Doktor, which provides doctor-patient communications through voice, video, and text, and allows doctors to issue prescriptions, is pioneering an innovative digital approach to back pain treatment with Kaia Health, a leading digital therapeutics company whose AI app has been shown to reduce back pain by 40%[1].

According to the World Health Organisation and the Office for National Statistics, back pain is a major cause of disability worldwide[2]. It is the leading cause of work absence globally and accounts for almost 31 million days of work lost costing the UK economy £14 billion a year[3]. The healthcare cost in Sweden for these patients is SEK 3 billion and the total cost, including sick leave, is SEK 25 billion.

Min Doktor physicians will prescribe the Kaia back pain app to patients suffering from repeat and/or chronic back pain. Each patient will be supported by Min Doktor physiotherapists throughout.

The Kaia app uses a multidisciplinary, mind-body digital approach to treat back pain, including education, physiotherapy and meditation. The treatment was developed with physiotherapists, pain management physicians, orthopaedic surgeons and clinical psychologists. Using sophisticated AI, the app tailors treatment programmes for each user from over 120 exercises. Motion tracking technology ensures that the exercises are performed correctly via a smartphone, without the need for additional hardware. This empowers individuals to take control, and self-manage their condition from the comfort of their home.

Magnus Nyhlén, founder of Min Doktor, says: "Traditional healthcare is broken. Patients with back pain have to wait several weeks or months for a doctor's appointment, only to be prescribed painkillers or physiotherapy until the pain returns. Our digital healthcare approach with Kaia Health will reboot the interaction between patients and physiotherapists and increase access to effective back pain treatment."

Kaia Health is a member of the Digital Therapeutics Alliance, an association of international manufacturers for digital therapeutic products that meet excellence in high quality standards. The company recently launched the world's first AI fitness app which uses patent pending motion-tracking technology to turn your smartphone into a personal trainer.

Konstantin Mehl, Founder & CEO of Kaia Health says: "The Min Doktor partnership demonstrates why we need to rethink how we treat diseases, and make digital self-management a more realistic part of treatment. By digitising back pain therapy, we can democratise access to effective, non-pharmacological, treatment which can be administered quickly and conveniently from the comfort of a patient's home."

1. Treatment of Low Back Pain with a Digital Multidisciplinary Pain Treatment App: Short-Term Results *http://rehab.jmir.org/2017/2/e11/*
2. The World Health Organisation. Lower Back Pain *http://www.who.int/medicines/areas/priority_medicines/Ch6_24LBP.pdf*
3. Bad backs cost the UK 31 million days of work costing the UK economy £14bn a year *http://www.nhsemployers.org/news/2015/04/bad-backs-cost-the-uk-31-million-days-of-work* ■

Contact-Free Vitals Sensing Helps Tackle Challenges Faced by US Hospitals

The world's leading hospital bed manufacturer, Hill-Rom, has integrated continuous contact-free heart rate and respiratory rate sensing and analytics technology, from EarlySense, into their Centrella® Smart+ bed platform.

The Centrella bed, which offers optimised patient safety, enhanced patient satisfaction and advanced caregiver-focused technology, now allows for continuous monitoring of patients' heart and respiratory rates over 100 times per minute without ever touching the patient. EarlySense® technology alerts clinicians to potential patient deterioration events much earlier than traditional monitoring methods, enabling health teams to intervene and avoid "failure to rescue" scenarios more effectively.

Specific improved clinical outcomes demonstrated with this technology include helping reduce mortality related to "code blue" events by 83 per cent[1], and cardiac arrests by 86 per cent.[2] In addition, clinicians reported overall hospital length-of-stay was reduced by 9 per cent[2], and ICU days by 45 per cent.[2] Several EarlySense customers have reported that the system also assisted with early detection of sepsis, a condition that, when not identified and treated rapidly, may be life-threatening.

"Hill-Rom's Centrella bed is transforming inpatient care by integrating advanced sensing and analytics into the bed, offering a complete patient safety platform to assist clinicians in providing the highest level of care," said John Groetelaars, president and CEO of Hill-Rom. "EarlySense has been used to effectively monitor close to a million patients, positively affecting patient outcomes. By integrating the EarlySense technology into our Centrella beds, we are ushering in a new era in quality of care, whereby all patients can be continuously monitored throughout their entire hospital stay."

"No patient should deteriorate without prior warning in the hospital environment. Continuous vital signs measurement should be the standard of clinical practice in the United States," said Dr. Frank Overdyk, a Charleston, SC-based anesthesiologist and expert on respiratory compromise. "Events such as opioid-induced respiratory depression and loss of life from failure-to-rescue are no longer acceptable given the availability of continuous vital signs monitoring."

"We are proud to be Hill-Rom's exclusive bed integration and nurse call communication partner, making our sensing and analytics technology available for more hospital patients and ensuring timely, effective clinical intervention is achieved," said Avner Halperin, co-founder and CEO of EarlySense. "Integrating EarlySense monitoring capabilities with the Hill-Rom Centrella bed platform will advance our collective aspiration of having every patient in every hospital continuously monitored for safe, data-driven care, with the potential to save thousands of lives and significant costs for the healthcare system."

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Researchers Study New App for Head and Neck Cancer Patients

A pilot study will test a new digital application, called NorthTrac, developed by The Feinstein Institute for Medical Research to help head and neck cancer patients manage their post-treatment symptoms.

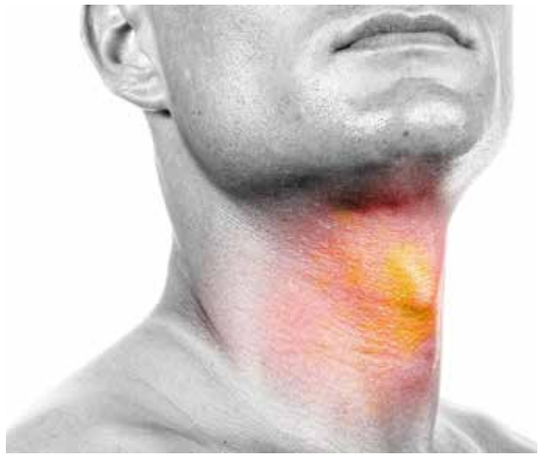
Typically there are three types of treatment used for head and neck cancers – radiation therapy, chemotherapy and/or surgery. Each of these comes with its own host of post-treatment symptoms and challenges, including dry mouth and sore throat. Sewit Teckie, MD, is a radiation oncologist at Lenox Hill Hospital in Manhattan where she treats many of these patients. Dr. Teckie, and her colleague Michael A. Diefenbach, PhD, professor at the Feinstein Institute, recognised a need for a resource to help head and neck cancer patients so they could have more meaningful discussions with their doctors.

"A head and neck cancer patient who has completed all of her cancer treatment regimen typically sees her doctor every three months. It can be challenging to accurately track and discuss her symptoms and receive advice to relieve those symptoms," said Dr. Teckie, who is also an assistant professor in the Department of Radiation Medicine and the Feinstein Institute's Center for Health Innovation and Outcomes Research. "I developed NorthTrac with Feinstein Institute researchers and technologists to not only provide a way for patients to maintain a log of symptoms but also offer immediate informational resources to help combat those symptoms."

Developed with the Feinstein Institute's Center for Research Informatics and Innovation, NorthTrac is an app for the iPhone or iPad in which patients answer a series of symptom-based questions – twice a week – rating the severity of these symptoms. If a patient tracks that they're having an issue with a particular symptom, a window pops up with a list of different self-care tips that can be done at home to help reduce or manage those symptoms. All information tracked is collected and sent to the patient's medical professional so it can be discussed at their next consult. Beyond the tracking of symptoms, the app is also an information resource for support groups and other organisations dedicated to aiding survivors of head and neck cancer.

The initial pilot study is open only to Northwell Health patients, but Dr. Teckie and her team hope to launch the app widely later in 2019. If this trial is successful, there is opportunity to adapt the NorthTrac app to help patients living with other cancers and chronic conditions.

"Building an app in-house at the Feinstein Institute opens an important window into technologies we can develop to address other medical needs," said Kevin J. Tracey, MD, president and CEO of the Feinstein Institute. ■



Diabetes Pathway Improving Care Efficiency and Patient Outcomes In Northern Ireland

Following the implementation of the Northern Ireland Electronic Care Record (NIECR) by Health & Social Care NI (HSCNI), Orion Health is pleased to announce that a new Diabetes Pathway has been rolled out across the country. Following a successful pilot exercise with a small number of users including nurses, consultants and podiatrists, the pathway can now be accessed by all diabetes clinicians across Northern Ireland, improving the treatment and care of more than 100,000 patients across the country.

"We are delighted the new Diabetes Pathway is now live and being used by the multi-disciplinary group of medical professionals involved in caring for patients living with diabetes", commented Gary Birks, General Manager UK & Ireland for Orion Health. "The Pathway builds upon the rich clinical data available within the NIECR, such as real-time laboratory results, and allows clinicians to access this information easily in one place leading to more effective and efficient patient care. This includes professionals who have often sat on the periphery of information sharing, such as podiatrists."

Previously clinicians had to use separate systems for paediatric and adult patients and information could not be accessed or interrogated from one trust to the next. Significant time was required to re-key information from one system to another and reporting was virtually impossible at a national level, making it difficult to establish trends in patient conditions and improve treatment plans going forward.

The new Diabetes Pathway now allows clinicians and other medical professionals involved in the treatment of patients with diabetes to access accurate and timely information when and where they need it. The need to re-key data is removed, and information can be shared between trusts should a patient move location or data is required for reporting purposes. Clinicians now have a holistic view of their patients, which brings benefits such as being able to factor in treatment for unrelated conditions into their diabetes treatment plan.

"Diabetes is a chronic illness with serious consequences for patients if they do not receive regular and appropriate ➪

treatment." commented Dr Roy Harper, Senior Endocrinologist, South Eastern Health & Social Care Trust, "With diabetes diagnoses now double what they were 20 years ago in the UK, the requirement for high quality and timely diabetes treatment is imperative. The new Diabetes Pathway provides clinicians such as myself with this level of information allowing us to be proactive in our care and provide a much better journey for patients, increase their confidence in the treatment plan and improved outcomes in the long run."

One of the most common complaints from patients was the continual need to repeat their symptoms and conditions to every clinician they met. Now with the Diabetes Pathway, clinicians have this information at their fingertips and they can spend time discussing more important matters with their patients. The system also operates in real time so should a patient attend a foot clinic at their GP surgery the information is immediately available to their consultant within the NIECR portal.

A fundamental benefit of the Diabetes Pathway is that it facilitates better engagement between clinicians and patients, however it has also improved engagement between medical professionals from different disciplines. Treatment delays stemming from previous ways of working that relied heavily on paper communication, such as lab results, have been all but eradicated. The Diabetes Pathway now provides the information clinicians need to treat the patient effectively in one place and available before the consultation, bringing real benefits to the day-to-day work of medical professionals, operational efficiency gains for the Health Service and better and more proactive care for patients living with diabetes. ■

Device for Objectively Assessing Patients at Risk of Pressure Ulcers Receives FDA Authorisation

Bruin Biometrics has been granted U.S. Food and Drug Administration (FDA) marketing authorisation for the SEM Scanner, becoming the world's first FDA-authorised device to objectively alert clinicians to specific anatomical areas of a patient's body at increased risk for developing pressure damage. Patient risk assessments are performed with the SEM Scanner before visible damage manifests at the skin surface – a world and clinical first.

The SEM Scanner received European CE Mark approval in 2014 and Health Canada clearance in 2016 and is in full commercial use in Canada and the European Union including the UK, Belgium and Spain with additional markets expected to be opened in 2019.

FDA granted marketing authorisation for the SEM Scanner under its de novo review process for novel low- to moderate-risk devices that are not substantially equivalent to an already legally marketed device.

More than 2.5 million people annually develop bed sores in the United States, including nearly one out of ten patients in hospitals and almost one-third of patients in long-term acute care.[1] The bed sores can lead to pain, disfigurement, infection and complications such as sepsis, cellulitis, and MRSA. 60,000 Americans die each year[1] from complications from pressure ulcers – an equivalent mortality rate to the opioid crisis[2] -- at an annual cost of up to $11.6 billion to the U.S. health care system.[3] These injuries result from pressure and shear causing localised damage to the skin and underlying tissue, typically at areas of bony prominence, such as the heels and sacrum.

Internationally, Pressure Ulcers represent a significant clinical and financial burden with a prevalence of 8.3% to 23% dependent upon the country.[4-5] In the UK for example, recent research from NHS Improvement[7] shows that treating pressure damage costs the NHS more than £3.8m per day, and that 1700- 2000 patients per month develop pressure ulcers.[6]

FDA authorisation was based, in part, on data from a clinical study assessing performance of the SEM Scanner compared to visual skin assessment by nurses in 182 patients at risk for pressure ulcers at 12 hospitals and skilled nursing facilities in the U.S. and United Kingdom.[8]

BBI CEO Martin Burns welcomed the FDA decision: "Our singular objective is to reduce pressure injury incidence by helping clinicians make prevention real. Total prevention of avoidable pressure injuries is mathematically impossible under the current standard of care. Prevention success demands objective, early, anatomically specific data. For the first time, in the US, clinicians will have access to anatomically specific risk assessment data that can be gathered from increased risk patients in all care settings. We are optimistic of the impact this data will have on prevention strategies in the U.S.A."

To date in the UK alone 20 different healthcare facilities have experience of using the SEM Scanner within a number of different healthcare settings including: Medical, Orthopaedic, Elderly care, Intensive Care, Vascular Care and End of Life Care. Individual NHS trusts and private providers have enjoyed and won numerous awards for innovation and patient safety, including the Health Service Journal's Patient Safety Award for Innovation (2017)[9] and the Journal of Wound Care's Most Innovative Product (2018)[10] for their use of the SEM Scanner.

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9. *https://awards.patientsafetycongress.co.uk/patient-safety-awards-winners-2017-1*
10. *https://www.jwcawards.com/winners* ■

FDA Approves mHealth Platform for Asthma & COPD Care Management

The U.S. Food and Drug Administration have approved a mobile health device that works with a companion mHealth app to measure inhaler use by people living with asthma and COPD.

The ProAir Digihaler, developed by Teva Pharmaceutical, is approved to treat or prevent bronchospasm in people ages 4 and older with reversible obstructive airway disease, as well as to prevent exercise-induced bronchospasm. It consists of a breath-activated, multi-dose inhaler that dispenses albuterol, as well as sensors that track inhaler use and inspiratory flow. Data tracked by the sensors is collected on the mHealth app.

"This approval marks a significant milestone not only for Teva, but for the respiratory community as it allows patients and their caregivers to better understand inhaler usage through digital technology," said Sven Dethlefs, Executive Vice President, Global Marketing & Portfolio. "Teva recognises the importance of integrating technology into patient care, and we are very proud to lead the way with the approval of ProAir® Digihaler™. The digital technology built into ProAir® Digihaler™ provides patients with data on their inhaler use, which may help them to have a more informed dialogue with their healthcare provider regarding their asthma or COPD management."

ProAir® Digihaler™ contains built-in sensors that detect when the inhaler is used and measure inspiratory flow. This inhaler-use data is then sent to the companion mobile app using Bluetooth® Wireless Technology so patients ⇨

can review their data over time, and if desired, share it with their healthcare professionals.

"There are 25 million Americans living with asthma[1], many of whom use inhalers as part of their treatment regimen. Despite advancements in care over the years, we know that many are using their rescue medications incorrectly[2] or too often[3]," said Tonya Winders, President & CEO of the Allergy & Asthma Network. "The FDA approval of ProAir® Digihaler™ is significant because it may help patients track their inhaler usage and provide data that can be used to work more closely with their HCPs on their asthma management. This approval is a major step forward and is indicative of how medications are evolving through technological innovations."

The approval of ProAir® Digihaler™ is based on the review of a supplemental new drug application (sNDA) submitted by Teva to the FDA. ProAir® Digihaler™ combines a breath-activated, multi-dose dry powder inhaler with albuterol, the most widely used asthma rescue medication, with a built-in electronic module and a companion mobile app.

"One of the challenges physicians are faced with in caring for their asthma and COPD patients is knowing if their patients are using their inhaled medication as they

should. That's what makes a product like this so important to doctor-patient discussions," said Tushar Shah, M.D., Senior Vice President, Global Specialty Clinical Development at Teva Pharmaceuticals. "Offering a tool that enables doctors to see data on their patients' inhaler usage will allow them to have more productive conversations about identifying issues and how to manage their illness."

ProAir® Digihaler™ will be available in 2019 through a small number of "Early Experience" Programs, which will be conducted in partnership with healthcare systems and in limited geographies, in order to gather real-world experience. A national launch is planned for 2020.

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Health Innovation Exchange Supports Digital Health Company to Develop Mental Health Programmes

Mental health company Oh My Mood are developing their blended care pathways programme for the UK market, with support from the Health Innovation Exchange (HIE) project.

Oh My Mood, who this year chose Liverpool as its UK base, work with clinicians, universities to make evidence-based blended care pathways available to mental health therapists and service users in order to make mental health support more effective and accessible.

Their modular approach to mental health care means that the programme can be tailored and adapted to each individual service user. By developing digital solutions to support face-to-face therapies their blended care approach aims to make mental health therapy more efficient thereby easing the strain on health practitioners.

HIE partner Liverpool John Moores University (LJMU) is working with Oh My Mood by introducing them to the Improving Access to Psychological Therapies (IAPT) teamwho provide evidence-based psychological therapies to people with mental health problems. IAPT are working with Oh My Mood on evaluating and assessing their innovative care pathways for the UK market.

LJMU is also linking their postgraduate students with Oh My Mood to help run a series of seminars on mental health across the City Region. Already a success in other cities including Maastricht, the Netherlands, Psychology Unwrapped are scientifically based events around mental health care topics designed to remove the stigma around mental health by creating awareness and openness to talk about these issues.

Jaime Essed, founder and CEO of Oh My Mood, said:
"Blended care, where traditional therapies and the latest eHealth methods are seamlessly integrated in mental health care pathways, is a relatively new concept. After only using evidence-based methodologies during the development phase, we were very excited to be introduced to LJMU through the Health Innovation Exchange programme. With the IAPT team as our research partner, we will set out to rigorously evaluate, assess and provide evidence that our blended care pathways provide high-quality, affordable and future-proof mental health care that benefit service users worldwide."

Grahame Smith, Reader in Mental Health at Liverpool John Moores University, said:
"Oh My Mood is driving innovation in the mental healthcare sector and I am thrilled that the Health Innovation Exchange project has been able to offer support and close collaborations with academia to help them further develop their programmes."

Looking ahead, Oh My Mood will be looking to implement their blended care pathways with a number of UK mental health trusts and also have plans to make their solutions available in other European markets. ■

IBM Research Develops Fingerprint Sensor to Monitor Disease Progression

IBM has developed a small sensor that sits on a person's fingernail to help monitor the effectiveness of drugs used to combat the symptoms of Parkinson's and other diseases. Together with the custom software that analyses the data, the sensor measures how the nail warps as the user grips something. Because virtually any activity involves gripping objects, that creates a lot of data for the software to analyse.

Another way to get this data would be to attach a sensor to the skin and capture motion, as well as the health of muscles and nerves that way. The team notes that skin-based sensors can cause plenty of other problems, including infections, so it decided to look at using data from how a person's fingernails bend instead.

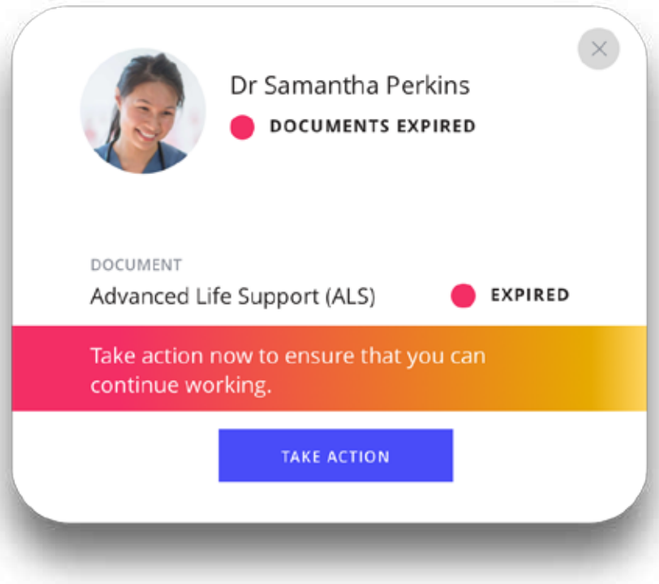
For the most part, though, fingernails don't bend all that much, so the sensor had to be rather sensitive. "It turns out that our fingernails deform — bend and move — in stereotypic ways when we use them for gripping, grasping, and even flexing and extending our fingers," the researchers explain. "This deformation is usually on the order of single digit microns and not visible to the naked eye. However, it can easily detect with strain gauge sensors. For context, a typical human hair is between 50 and 100 microns across and a red blood cell is usually less than 10 microns across."

In its current version, the researchers glue the prototype to the nail. Because fingernails are pretty tough, there's very little risk in doing so, especially when compared to a sensor that would sit on the skin. The sensor then talks to a smartwatch that runs machine learning models to detect tremors and other symptoms of Parkinson's disease. That model can detect what a wearer is doing (opening a doorknob, using a screwdriver, etc.). The data and the model are accurate enough to track when wearers write digits with their fingers.

Over time, the team hopes that it can extend this prototype and the models that analyse the data to recognise other diseases as well. There's no word on when this sensor could make it onto the market, though. ■

UK's First Digital Tool for Onboarding GPs Marks Clinical Governance Breakthrough

A new 'medic passport' designed by GPs and created by Dr Focused, aims to put an end to the shortfalls of offline clinical governance procedures and improve quality across primary care. It is predicted that the new solution will speed up the recruitment of GPs tenfold.



Designed by GPs, the new medic passport software is a simple, safe and compliant online HR software that recruits and onboards GPs, before giving the green light for them to start practising. Dr Focused reduces the time it takes to recruit GPs and eradicates the risks associated with human error.

The new tool provides every GP with their own medic passport, which can be shared with other employers, helping them to avoid paperwork and the need to present legal certificates each time. The software also gives GPs access to their development plans and training that is on offer to them.

Dr Kit Latham, Founder of Dr Focused and the creator of medic passport explains why GPs were central to the creation of the new machine learning tool: "Spending quality time with patients is the most important part of being a GP – paperwork is tiresome, and distracting. I have worked with GPs to create a way to reduce the amount of time health workers spend doing paperwork. Together, we have created the fastest way for any doctor or healthcare worker to join a new employer, and to stay up-to-date.

"To ensure that our medic passport would give its users the best possible experience and outcome, we chose to test the service by working with an organisation that regularly employs lots of GPs, and one that has an 'Outstanding' CQC rating – GPDQ ticked both boxes."

Responsible for shaping and testing the new tool is NHS GP and founder of GP on demand service GPDQ Dr Anshumen Bhagat, he comments: "Until now all clinical governance has been manual and offline, leaving too much space for error, hence why so many organisations in UK primary struggle to remain compliant. Out of 30 Care Quality Commission (CQC) reports that proved to be unsafe - 90% of them were due to documents not being available.[1]

"I have a portfolio of NHS and private GP practices, so I am constantly searching for better, safer ways to manage every aspect of our service. I was therefore keen to advise the team at Dr Focused in the creation of the medic passport tool. At GPDQ we recruit many GPs each year, so this tool will play an important part in ensuring we remain compliant and live up to our recent 'outstanding' CQC rating as an organisation.

"In general practice, clinical governance encompasses both quality improvement and accountability. Systems for both must be developed fully if the highest levels of quality of care and professional performance are to be achieved – in my opinion, this can only be done effectively using a digital solution. I'm proud to say that GPDQ was the first organisation to adopt the new medic passport software."

1 *https://www.cqc.org.uk/guidance-providers/regulations-enforcement/regulation-18-staffing* ■

Upcoming events

January 2019

21-22 Social Media in the Pharmaceutical Industry

London, UK
For more information visit
http://www.social-media-pharma.com/jmhban

February 2019

4-5 2nd AI-PI Drug Discovery

San Francisco, CA, USA
For more information visit
http://ai-drugdiscovery.com

March 2019

12-13 Digital Health Technology Show

London, UK
For more information visit:
www.digitalhealthtechshow.com

18-19 National Healthcare CMO/CNO/ Informatics Summit

Los Angeles, CA, USA
For more information visit:
https://events.marcusevans-events.com/

18-19 Future Healthcare 2019

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

25-26 Digitalhealth Rewired

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

26 WIRED Health 2019

London, UK
For more information visit:
www.wired.uk/health-event

April 2019

3-4 ebme Expo

Milton Keynes, UK
For more information visit
http://www.ebme-expo.com/

9-11 DMEA

Berlin, Germany
For more information visit
https://www.dmea.de/en/