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The Journal of mHealth

The Global Voice of Digital Health

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Digital Ecosystems and the Changing Health Landscape

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Welcome

As 2021 draws to a close we would like to take this opportunity to thank all our readers for another year of incredible support!

The audience of the Journal of mHealth has grown considerably over the past few years as the shift towards digital healthcare transformation accelerates and we are very pleased to have become one of the leading resources for insights, trends, and practical support for navigating the changing digital healthcare landscape. As we look forward to 2022, we will be looking to provide new and exciting resources designed to help our readers stay at the forefront of the digital health revolution.

In this final edition or the year, we bring together a range of content that analyses the ways that Digital Ecosystems are Changing the Health Landscape. We consider the impact that these ecosystems are having on different aspects of healthcare provision, from radiology to diagnostics and drug development to training, and discuss the implications for the industry going forward.

Managing these intersecting digital ecosystems is becoming the new challenge for healthcare. With the implementation of technology-led care at an all-time high, technology and data are rapidly becoming the foundation of healthcare delivery. There is therefore a growing need to strategically manage the way that these technologies interact and ensure that data flows between different aspects of care delivery in intelligent and efficient ways.

Knowing the pressure that healthcare professionals have faced over the past couple of years, we would also like to take this opportunity to recognize the amazing commitment that so many have provided. Those within the healthcare community continue to face what must seem like never-ending challenges, leading to significant stresses for all, and for that we wish to express our heat-felt thanks!

From all the team at The Journal of mHealth we wish our readers all the very best for the New Year and hope that 2022 will prove to be a year of hope and fulfilment!

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Editor

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The Next Frontier

How Integrated Digital Ecosystems will Drive the Future of Healthcare

Building mature, fully integrated digital ecosystems, with cutting-edge technologies at their centre, will lay the foundations for world-leading and efficient care that makes a real difference for patients, writes Hani Abouhalka, Company Group Chairman, Johnson & Johnson Medical Devices Companies, EMEA.

The COVID-19 pandemic will leave many legacies for the healthcare industry. Many are obvious, such as the increased prominence of health in the public mindset, or the close co-operation between healthcare systems, industry, academia, and Governments to deliver game-changing solutions when needed, most obviously with the vaccine development and roll out.

A more surprising legacy, however, is the rapid acceleration in uptake of digital technologies in healthcare. For example, right now, we know close to 50% of physicians and diagnostic specialists are using telehealth to treat patients, compared to just 18% pre COVID [1]. To me, this demonstrates that healthcare systems have the ingenuity and drive to innovate and utilise digital technologies – and that industry has the ability and willingness to meet these needs.

The trends underlying this shift were already there. Think of value-based healthcare, which links cost efficiency to patient outcomes and particularly a need for data to measure and confirm value. Or the increase in available digital solutions supporting everything from patient pathways to surgical excellence to hospital logistics, delivered not just by traditional MedTech companies like my own but also innovative start-ups. Or the data science which captures the evidence from these same solutions. Or the telemedicine and omnichannel engagement which facilitates patient treatment and surgical support at a distance.

What's clear however is that COVID-19 has been a catalyst for the accelerated use of such technology. Now, as we tentatively emerge from the pandemic, thanks in a large part to successful vaccination programmes, the question remains: with ever increasing elective surgery backlogs, how can we maintain this momentum with digital technologies and future-proof our healthcare systems to deliver the triple aim of improving outcomes, lowering cost, and increasing access? The answer, I believe, lies in building integrated ecosystems that connect the care pathway: pre-operative, in the OR, and post-operative care.

We know the vital benefits that technology can bring, particularly in limiting variation whilst improving patient outcomes. But too often we can focus on the individual pieces of technology, for example, the cutting-edge robots used in surgery. These are of course amazing innovations, but digital therapeutics is not just about individual solutions and technologies, no matter how eye-catching and exciting they might be. It is also about the vital framework around these solutions with policies for data, data ownership, and data privacy. By looking at the whole pathway and ensuring as much connectivity as possible, healthcare systems can lay the groundwork to capitalise on the full benefits that digital technology has to offer.

We need to imagine an integrated digital ecosystem that can connect all digital products and services. This will mean that anonymised data can be analysed, shared, and used to enhance existing solutions, and develop new modules that meet existing and future trends. Such a system also benefits patients by making the care pathway smoother, simpler and less stressful. It would reduce delays, allow patients to access care quickly and easily through remote connectivity, remove hospital system pain points, and improve efficiency.

At Johnson & Johnson, we are reimagining the future of health today by working to make such an ecosystem a reality. Our combined pharmaceutical, consumer health and medical technology expertise, alongside our global footprint, uniquely positions us to innovate next generation digital solutions.

We are developing a connected ecosystem of digital products and solutions that reimagines the entire patient journey - building an integrated digital ecosystem that will connect all digital products and services, leveraging data science capabilities to generate deep insights powered by predictive analytics, machine learning and artificial intelligence.

We envision that this digital ecosystem can be embedded and accessed within existing hospital IT infrastructure so customers can focus on improving patient pathways, digital surgery and OR management. They will be able to gain insights and download apps and modules within different healthcare settings to manage the complete end-to-end patient pathway. Such an interconnected digital platform will allow us to continue developing next generation robotics, best-in-class surgical instruments, advanced visualisation and imaging tools, and digital solutions with AI and machine learning capabilities to drive the industry forward.

But industry cannot do this alone, and we need strong partnerships with healthcare systems, just like the ones forged during the midst of the pandemic, to implement and embed these ecosystems. The benefits of such a partnership for healthcare systems are clear: delivering improved patient experience through faster diagnosis, better pre-operative planning, more precise surgery, and better post-operative care; more insights and learnings for physicians who can also treat more patients (even remotely in overseas settings); overall greater efficiency in hospital and clinical settings; and reduced costs. The foundations for this within healthcare systems are already there too. 70% of European HCPs consider themselves digital natives [2,3] and we've seen through the pandemic how quickly healthcare systems can adopt innovation.

I believe the time is now, when the world is finally able to start thinking about life after COVID, that industry and healthcare systems must capitalise on existing expertise and momentum. It is only by working together that we can build the mature digital ecosystems of the future – the kind of ecosystems that we need to fully embrace the revolution in medical technologies, and to ensure we deliver world-leading and efficient care.

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5 Global Macro Trends in Radiology

Philip Brentnall, Product Strategy Manager and Clinical Lead at Wellbeing Software, discusses the five trends we can expect to see in 2022

It is widely acknowledged that 2020 and 2021 have been two of the toughest years on record for the healthcare sector. With cancellation lists growing by the day and millions of patients still waiting for consultations, scans, or operations, the pressure on staff and infrastructure has been considerable.

Even before the COVID-19 pandemic, experts identified that 45% of radiologists experienced some form of burnout, mainly due to being overwhelmed by the administrative burden of the job and the substantial number of images that needed to be checked manually.

Adding to the pressure is the worldwide shortage of radiologists, significantly impacting screening services. The Clinical Radiology UK Workforce Census 2020 suggests that by 2025 there will be a 44% shortfall in the clinical radiology workforce, further burdening the existing radiology cohort.

Outdated infrastructure is also an issue. In the US there has been a huge drive to encourage healthcare facilities to adopt electronic health records, as there is no centralised system for patient data. So much so, the government has created a $27 billion incentive program to drive home the benefits of digital systems.

On the upside, the impact of the pandemic has given medical institutions an insight into the future of healthcare through an accelerated adoption of technology. In this article we will look in more detail at five trends we are expecting to see in radiology for 2022.

Artificial Intelligence

The adoption of innovative technologies can create significant benefits for individual workloads. Tools such as Artificial Intelligence (AI) and the infrastructure that supports it enable radiology ⇨

departments to share information accurately, rapidly, and securely between multiple users and organisations.

AI can also help address the shortfall in radiologists. Through machine learning, the software has the potential to review and score scans much faster than the human eye. This is not to say it is physically replacing people but working alongside them to reduce the time necessary for certain tasks and improve overall efficiency.

For example, The Royal Australian and New Zealand College of Radiologists (RANCZR) recently reported a 27% increase in breast cancer detection rates as a result of using AI. It also found that by using artificial intelligent-based computer aided detection software, false marks fell by a remarkable 69%.

One element of artificial intelligence that has seen a sharp increase in demand is deep learning. This subset of AI has proven to be more adept when it comes to ingesting medical data and extracting valuable insights. Experts believe that the use of AI and deep learning will only continue to rise, with the expectation the global AI radiology market value will exceed $180 million by 2025.

Connected Radiology

A report published in 2015 suggested that radiologists needed to review an image every 3-4 seconds to keep up with their workloads, which has further highlighted the value of AI and connected systems.

Allowing radiology departments to share resources, improve workflows and reduce the impact of backlogs can add immense value. For this reason, we are seeing more healthcare facilities shifting toward shared imaging networks, as seen in the South West of England.

Pivoting to connected solutions not only helps mitigate burnout but should also be seen as an investment that enables ongoing improvements to diagnostics and patient care. With such strain on radiologists, a connected approach enables radiology departments to analyse complex data, reduce errors and increase efficiency.

Integrated Diagnostics

A clear focus for the NHS in 2022 will be addressing the vast backlog of outpatient appointments. In the 12 months

to March 2021 over 20 million patients received cancellations due to the knock-on effects of COVID-19, so embracing products and services that drive improvements across departments will be key.

For example, the right technology provides healthcare facilities and medical professionals with access to vast amounts of data to inform patient prognosis and reduce the backlog of cancellations. There is no doubt the pandemic has accelerated the use of integrated diagnostics in hospitals. By integrating data and systems across diagnostic services, we can reduce the time and expense spent on processes and provide clinicians with faster access to complete result sets, speeding up clinical decisions and the commencement of treatment.

As a result, the Industrial Strategy Challenge Fund is providing over £200 million to support the development of precision medicine to improve early diagnosis and treatment. The aim of the fund is to encourage academics and professionals to increase their use of health and research data.

Remote Working

The pandemic has forced the world to adapt to remote working and radiologists are no different. In fact, COVID-19 has accelerated a shift from manual processes to digital platforms in the healthcare sector. AI can be integrated into any Picture Archiving and Communications System (PACS), which not only reduces the administrative burden on individuals but also enables them to work from home in an environment that allows complete focus on reviewing imagery.

With social distancing measures in place and a greater emphasis on remote working, radiologists need to be able to access reports, even when they are away from the original scan site. By bringing data together, radiologists across the country can always have instant access to the same centralised patient record. This helps them share resources and access scans remotely to make faster and better-informed decisions, enabling patients to move more seamlessly between sites and services.

RIS Reporting

With increasing demand for integrated information systems, the lines between PACS and RIS are becoming less defined. However, there are fundamental differences and limitations that dictate the role each plays in radiology.

While PACS has its strengths in radiology imaging systems - storing and retrieving medical images - a RIS streamlines department workflow and manages critical functions such as reporting, order entry, tracking and inventory. It is important that a PACS and RIS integrate seamlessly to ensure patients move through the radiology department quickly and safely.

Moving forward there is a clear need for a more comprehensive and integrated system able to process vast volumes of imagery and reduce manual workloads. This places radiology at the forefront of professions able to drive and make the most of digital acceleration in 2022 and beyond. ■

Reinventing Clinical Trials with Virtual Technology

Article by Richard Coxon, Director, Life Sciences, Dassault Systèmes

The Covid-19 pandemic caused massive disruptions amongst clinicians, patients and communities. Labs, hospitals and clinical sites shut overnight, and research teams worked endlessly for months to discover potential vaccine candidates to bring to market as soon as possible. Although there is still a lot of flux in the world of clinical research in this post pandemic world, one thing is certain: the changes forced upon the pharmaceutical sector in response to the pandemic have opened many new possibilities for reimagining the way the industry operates in the future.

The new age of virtual clinical trials

When the WHO first announced that COVID-19 was a pandemic, governments all over the world took drastic steps to keep people from catching the disease, starting with lockdowns, travel restrictions and social distancing measures. Whilst this limited the spread of the virus, it also completely upended the traditional model of clinical trials, with patients coming into clinical sites for their regular visits suddenly becoming a major safety concern.

The pandemic emphasised that the tools and technologies the industry traditionally relied on for clinical trials were simply not fit for purpose in a digital-first world. New technologies and digital tools have been around for years, but the systematic adoption has been slow. In a report surveying senior leaders in the life sciences industry, many were amazed that the sector managed to develop, test and approve so many vaccines in such a short time. 70% of companies admitted that the processes they relied on at the start of the pandemic were outdated, and this was preventing them from working remotely and collaboratively. More challenging still, 62% struggled to even access valuable COVID-19 research due to these outdated processes. As a result, 84% of life sciences companies in the UK have accelerated their adoption of digital tools for clinical trials as a direct response to the pandemic.

Driving adoption of virtual trials

In response to the pandemic and global lockdowns the industry rapidly and universally pivoted to embrace virtual, or decentralised, clinical trials with the support of digital tools. This shifted traditionally site-based tasks into the safety and, ultimately, convenience, of patients' own home - conducting visits via telemedicine solutions, capturing key endpoint data with tools like eCOA (electronic clinical outcome assessments) on smartphones, and engaging with patients remotely. This foundational shift supported the development of vaccines against COVID-19 in record timeframes to treat millions of patients across the globe. The Moderna vaccine trial, for example, is one of the largest trials to incorporate data capture directly from participants using their own smartphones, simplifying participation and decreasing the need for site visits.

By adopting this decentralised approach to clinical trials, the life sciences sector has shown that it can operate at a much faster rate, whilst also reducing margins for errors and improving the testing process for both researchers and patients. This also effectively solves one of the biggest challenges in the pharmaceutical industry – patient recruitment and retention. Research teams are virtually able to reach patients across the world and, more importantly, patients tend to have a better experience in the trial. As a result, companies have been implementing more digital tools in the hopes of getting new drugs and treatments to patients faster.

Virtual trials are the future

As improving patient outcomes still remains the number one priority within life sciences, having the right tools is essential. This is why 72% of companies have implemented digital tools, to support the conduct of virtual trials, to help them innovate during the COVID-19 pandemic.

Using digital tools in the clinical trial process provides many benefits for healthcare companies:

- Accelerating information sharing and increased controls: As all the data lives in a centralised and secure digital platform, it is much easier to share it with relevant stakeholders, whilst managing authorisations and ensuring patient privacy at all times. This can drastically minimise delays and any data anomalies can quickly be identified and rectified.
- Simplifying the R&D process: As R&D teams had to reprioritise new research in response to COVID-19, they needed to quickly pivot their internal working processes. By operating in a digital environment, labs reduce the risk of human errors and time spent correcting them – making them the optimum working environment in response to a global crisis.

Beyond the immediate impact embracing digital tools has universally had on clinical research, there are even greater revolutions on the horizon. Through the use of big data, artificial intelligence and digital simulation tools, researchers are beginning to build virtual models of organs to study and test on. For example, The Living Heart Project is already well underway to serve as a common technology base for education and training, medical device design, testing and clinical diagnosis. Additionally, tools like a Synthetic Control Arm®, where historic patient data is used to mimic a control arm in a clinical trial, minimizes the need to put patients on placebo.

In the future, the ambition of the industry is to run a clinical trial on an individual's virtual twin – testing all kinds of doses and treatment combinations to identify exactly what will work best for a patient's genetic profile without having to actually administer any drug to the individual themselves until the most effective solution has been identified.

Beyond the pandemic

COVID-19 has brought many challenges to the industry. More than two thirds of life sciences companies had to put research into other treatments on hold. However, as the vaccine rollout programme continues, the industry needs to start looking at life beyond COVID-19.

Since the pandemic, the life sciences sector has proven that it can adapt to a radical change in operations. There is now a greater need for improved collaboration across teams and organisations to speed up the entire clinical trial process. Luckily, the same tools used by the industry to tackle one of the biggest public health crises of the 21st century can also be used to devise treatments for lesser-known diseases.

Decentralised clinical trials can help aid drug discovery, the launch of new drugs and medical devices and provide the right kind of patient care in any environment. Using better data management tools can help healthcare companies become more diverse and adaptable, opening the clinical trial process to a wider pool of participants that are more representative of the patient population. As we look to the world post-COVID, it is time to start normalising the process of virtual clinical trials for any condition and creating a new era of preventative care for all.

And this is just the beginning – through the eventual use of virtual twins, research and development will reach a whole new horizon. ■

Make Time to Focus on POCUS

With its potential to facilitate and expedite clinical diagnosis and increase the accuracy of many medical procedures, point-of-care ultrasound (POCUS) is being increasingly adopted throughout hospitals and the wider healthcare system.

POCUS provides patients the opportunity to see their images with their clinicians, helping them to understand their diagnosis, which can lead to greater engagement and compliance. From a healthcare provider's perspective, the technology offers a way to reduce costs, avoid the need to move a patient across the facility and bring a more collaborative approach to patient care.

However, to truly fulfil its potential, the POCUS solution must offer not only medical functionality and accuracy but also fit seamlessly into the healthcare provider's wider Imaging IT systems or Picture Archiving and Communications System (PACS). It is only then that healthcare professionals can acquire the complete and accurate medical imaging record they need to ensure quality of outcome and care for each patient.

Overcoming metadata issues

Unfortunately, not all POCUS technology can do what's described above. Some, for example, don't possess the worklist features that are typically common to larger departments, for example, radiology. This means that images captured on POCUS devices cannot be easily or automatically incorporated into core enterprise systems, such as the electronic medical record (EMR) or PACS. While PACSs, for instance, may be good at managing the flow of DICOM images within departments, it's much less effective when it comes to assimilating non-DICOM assets.

Any attempt to migrate data manually between systems is time-consuming and likely to lead to errors in transcription, with the consequent inclusion of 'rough data' into a patient's records.

However, this kind of functionality gap can be removed if the POCUS platform has the capability to automatically resolve issues relating to incomplete or incorrect metadata, for example involving order or accession numbers, then index and forward the revised studies to the appropriate destination. Automating the indexing of POCUS images, which often lack a formal radiology order, allows them to be indexed to the patient record in the EMR.

Avoiding clinical blind spots

Having the capacity to do this is a much better solution than being forced to create multiple PACS or siloed imaging systems for different specialities, which fails to address the longer-term issue of greater accessibility and interoperability.

When separate imaging systems develop across an organisation, this inevitably leads to the 'siloing' of data and disparate image archives, which then limits access to these clinically relevant images and may lead to information being omitted from the bigger diagnostic or clinical picture. It's not unusual, for instance, for organisations to find that important clinical imaging material is scattered across any number of locations, applications and solutions. These comprise of a myriad of PACS, CDs, non-networked hard drives and other removable storage.

This is a particular problem in proprietary, vendor-controlled environments, which is why it is important to seek out a vendor-neutral platform that allows you to integrate POCUS content with enterprise systems.

To avoid the creation of potential clinical blind spots Hyland's POCUS solution uses industry-standard protocols, API's and formats, to ensure that POCUS studies can be captured and managed across an enterprise, alongside images from DICOM modalities, e.g. Radiology, Cardiology as well as visible light image and videos from specialities such as, gastroenterology, dermatology, wound care, and all other departments.

Recognising the viewer preferences of different departments, such as radiology and cardiology, ensures there is no disruption to a healthcare organisation's existing approach to referential or interpretive viewing. So once POCUS studies are stored in Hyland's Acuo VNA, they can be made available enterprise-wide through the web-based NilRead enterprise, diagnostic viewer, allowing images from any modality to be accessed and referenced by clinicians on any personal computer or mobile device.

This allows clinicians to retain autonomy over access to an image and its manipulation and sharing, while contributing to cross-disciplinary, patient-centred care.

Scale and flexibility

The use of point-of-care imaging is only going to increase as technology evolves and clinicians become more confident using it. As it is, POCUS images already make up a significant portion of clinically relevant data that needs to be incorporated into wider systems.

So, it's critical that healthcare organisations recognise the importance of having a common enterprise-wide imaging framework that can be easily expanded and reshaped to changing needs. That requires a degree of interoperability that can't be achieved without an open, standards based, vendor neutral archive system.

As we've seen, there's an opportunity to do this if a solution is chosen with collaboration among key stakeholders in mind. That way POCUS can make a significant contribution to the enterprise-wide imaging picture that aims to improve patient outcomes, which after all is the whole point of caring.

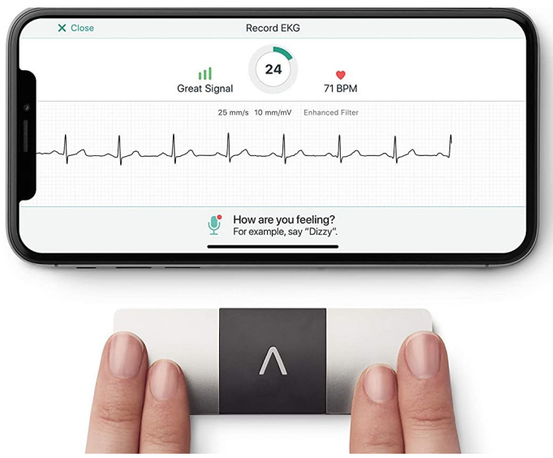
Article by Saduf Ali-Drakesmith is director, Global Strategy, Enterprise Imaging at Hyland. *www.hyland.com* ■

INDUSTRY NEWS

News and Information for Digital Health Professionals

Solve.Care and AliveCor to Offer Coordinated Cardiac Monitoring and Telehealth Service

Blockchain-based telehealth provider Solve.Care has partnered with AliveCor to offer a coordinated cardiac monitoring and telehealth service which will allow users of AliveCor's KardiaMobile devices and services to easily book teleconsultations with physicians using Solve.Care's Global Telehealth Exchange (GTHE) network.



Through the partnership, physicians on the network will be able to seamlessly access users' KardiaMobile electrocardiogram (ECG) readings, upon their consent. The Patients using the KardiaMobile 6L cardiac monitoring device, which is the first and only six-lead personal ECG cleared by the US FDA, will be able to seamlessly share ECG readings, upon their consent, with physicians registered on the GTHE - an open global cross-border telehealth network that enables doctors and patients to connect worldwide.

The partnership will see KardiaMobile devices integrated with Solve.Care's blockchain platform to enable its users to connect with a physician on GTHE directly through the Kardia app to share their ECG readings during their teleconsultations. As physicians have access to previous ECG readings stored by KardiaMobile, this will provide physicians with a more complete understanding of the patient's symptoms to facilitate more effective ongoing care. As GTHE is built using blockchain technology, all data is fully secured and remains in control of the patient.

Mark Bogart, Senior Vice President, U.S. Healthcare, AliveCor said, "Our partnership with Solve.Care is important to us as it provides an additional layer of peace of mind to our KardiaMobile users who wish to connect with physicians through the Solve.Care Global Telehealth Exchange network."

The agreement facilitates greater access to care, widening their choice of instantly booking a tele-consult with any specialized physician throughout the world directly through their mobile devices.

Pradeep Goel, CEO of Solve.Care said, "The healthcare industry is rapidly moving towards digitization. But we should never lose sight that the end-goal of healthcare is to improve the quality of life for the patient. This collaboration will immensely improve the quality of care for users of Care Networks on the Solve.Care Platform. With easy access to patients' ECG readings, physicians can provide better care to patients on GTHE, as well as the Diabetes Care Network, as patients with type 2 diabetes are at greater risk of cardiovascular diseases." ■

Salignostics Set to Commercialize World's First Rapid Saliva-Based Pregnancy Test Kit

Israeli medical startup Salignostics has begun commercializing Salistick, the world's first and only saliva-based rapid pregnancy test kit. This cost-effective, quick, and non-invasive method of detecting pregnancy leverages saliva-based hormone detection technology pioneered by Salignostics and delivers accurate results in just 10 minutes.

According to Salignostics, saliva contains over 5,000 identified proteins that mirror and overlap the physiological state of one's blood. Drawing from the same principles used to develop SaliCov, its highly successful rapid antigen saliva test kit to detect COVID-19, Salistick can detect the pregnancy hormone β-hCG in saliva and delivers proven and accurate detection rates for early pregnancy.

Salignostics is in very advanced stages of receiving the European Union's CE Mark for Salistick and has completed a 510(K) initial Q-submission of the test kit to the FDA in the US. The company has successfully completed clinical trials in Israel on more than 300 women, both pregnant and non-pregnant, and has completed thousands of analytical trials.

"Saliva is the key to rapid diagnostics for a variety of medical reasons. Quintessentially it is the only non-invasive, easy, and hygienic means to detect hormones, viruses, and even diseases," said Dr. Guy Krief, co-founder, Deputy CEO, and Director of Business Development, Salignostics. "With Salistick, we are leveraging the powerful diagnostics abilities we have been able to create from analyzing saliva. We are delivering a product that completely removes the need for blood and urine samples when testing for pregnancy."

The annual global market for pregnancy tests is estimated at over $2 billion, with an estimated hundreds of millions of tests sold every year. However, these tests all rely on results derived from blood or urine samples and often need to be conducted by a medical professional. Salistick can be used anywhere, at any time of the day; it is clean, painless, and can detect the β-hCG pregnancy hormone safely on the first day of a missed period without the intervention of medical staff.

Research conducted by Salignostics shows that over 68% of women surveyed would instead opt for a saliva-based test kit over traditional pregnancy detection tests, while 21% said they had no preference. A primary reason cited for this is the overall user experience, convenience, and cleanliness of the product.

A pioneer in saliva-based testing and diagnostics, the company's SaliCov simple COVID-19 antigen saliva test kit has proven highly effective and received a CE Mark from the European Union for marketing throughout Europe. To date, the company has provided hundreds of thousands of kits to Europe and Africa, and the test kits are the only saliva-based rapid antigen COVID tests which participate in the U.S. National Institute of Health's (NIH) RADx accelerator program.

Like the SaliCov kit, Salistick comes individually wrapped for hygienic purposes and has a handheld applicator for collecting saliva. Once the sample is collected (about one minute), the applicator is replaced via an intuitive twist and click mechanism into the compact analyzing unit while the results are analyzed, a process that takes no more than 15 minutes. These results are then displayed on results window, where two lines indicate a positive test, and one line means negative.

Results are derived exclusively on saliva analysis and are based on a platform technology. As the technology is not biomarker specific, it can be replicated and used for multiple applications and use cases—for example, COVID-19 and even malaria detection.

"As an industry, medical science must move forward. By cracking the code to saliva, we are helping advance how medical professions can perform diagnoses and give individuals the power to make informed decisions about their own health and well-being. With Salistick, we hope to empower women by making the discovery of pregnancy more dignified and inclusive," ended Dr. Krief. ■

Pilot Study Demonstrates Effectiveness of At-home Skin Cancer Treatment

Researchers have found that a new prototype photodynamic therapy device can be used at home to reduce pain levels during treatment of basal cell carcinoma, while achieving results comparable with a hospital stay. These findings come from a breakthrough pilot study, revealed at the 30th EADV Congress.

The efficacy of photodynamic therapy (PDT), a treatment that involves light-sensitive medicine and a light source to destroy abnormal cancer cells, for low-risk basal cell carcinoma (BCC) has been proven through multiple studies. However, a need to reduce the pain experienced during treatment and the long hospital stay prompted the development of a new device, even before the COVID-19 pandemic. Standard PDT treatment consists of two sessions performed within a hospital environment that usually requires a 1.5-2 hour wait with a one-week interval.

Ana Gabriela Salvio, lead author of the study commented: "The importance of a portable PDT device is crucial in its country of origin, Brazil, where many patients need to travel more than 300km to receive specialised dermatological treatment. However, the global pandemic accelerated the need to develop this at-home treatment element, which has the potential to impact the treatment of BCC internationally."

15 patients took part in the pilot study at Amaral Carvalho Hospital together with Sao Carlos Institute of Physics, in Sao Paulo State, Brazil. The first PDT session was performed at the hospital where a 20% methyl aminolevulinate cream was applied to the BCC lesion, which was then illuminated for 20 minutes with a commercial red light LED device.

Immediately after the first illumination, a light layer of cream was applied and the new portable irradiation device - the size of a coin - was fixed to the skin using medical adhesive tape. The patient was then sent home and advised to turn on the illumination after 1.5 hours and turn it off after 2 hours.

Pain was assessed every 3 minutes during the hospital PDT treatment session and self-reported every 20 minutes during home treatment on a numerical scale from 0 to 10. The median score values were compared between hospital and home treatments.

According to histological analysis, the clearance at 30 days after PDT was 86.67%, which is similar to standard PDT treatment, and the pain score was significantly lower for the PDT treatment performed at home [self-reported by the patients as a 1 for the first three measures and a 0 for the four that followed], as compared to 3-4 for the hospital treatment, suggesting that a more comfortable treatment with less pain is possible. ■

RFiD 'Theatre kitting' Solution Helps Hospitals Relieve Surgery Backlog Pressures

The pandemic continues to have a severe effect on waiting lists for elective surgery in the UK and preparing materials for scheduled and emergency procedures takes up a lot of clinical time. However, pioneering radio frequency identification (RFID) theatre kitting technology, which streamlines the management of theatre supplies, could help reduce the elective surgery backlog caused by COVID-19.

RFiD Discovery, the UK's leading location tracking specialist for healthcare have introduced a "Gold Standard" material management solution enabling theatre consumables to be delivered to the point of use. The technology allows theatre teams to have the correct equipment at their fingertips, helping to improve efficiency and quality of care.

Traditionally clinical staff in the local theatre areas are responsible for preparing all inventory required for the next day's operations. On top of being time-consuming, this can dilute the skills and knowledge available in a particular theatre, thus compromising patient safety.

The 'theatre kitting' solution allows this process to be centralised so that clinical staff are freed up to spend more time on patient care. It also reduces the risk of picking incorrect products or having insufficient supply of key items readily available. By improving efficiency, the technology can also bring important cost savings to hospitals, as well as helping to reduce waste – ultimately allowing hospitals to be as "lean" as possible.

Simon Dawkins, lead RFID consultant at RFiD Discovery, explains: "Working in an operating theatre can be pretty stressful and challenging, – meeting the needs of patients, the demands of surgeons and facing the limits of time itself. With the present situation of staff shortages across the NHS, there has never been a more crucial time than now to allow clinical staff to focus on their job, and more importantly, improve patient care and safety. Our transformational service is designed to do just that."

The RFiD Discovery theatre inventory management system is designed to track items used for operations with passive RFID labels. Clinical staff curate a custom list of required equipment for specific types of operations, which is captured on the system and used to create the procedure kits. The actual packing of equipment is carried out by a central kitting team.

Central kitting staff download the relevant list for each type of operation to a handheld scanning device which indicates which location in the central store each item can be picked from. Items are then scanned and added to a tote box

specific for each patient. To reduce waste, kits only include the items that are normally needed during an operation.

Unless all items required have been picked and scanned, the system automatically prevents the completion of the tote. This improves patient safety by ensuring that all the correct items are to hand when needed. Post operation the tote box is received back in the central store where the RFID labels are then scanned by the inventory team. This means all consumables used can be accounted for, so that an accurate overall material cost of each operation is recorded and stock correctly replenished. Furthermore, any unused items are placed back on the shelves for future use.

The technology has already been successfully implemented at one of the largest hospitals in the UK – where it has been instrumental in freeing up time for clinical staff, optimising stock holding and minimising waste. Theatre kitting processes are now used for all of the trust's theatres. Due to reducing waste and the number of items used for each operation, the hospital has also been able to reduce the per-case cost.

There are currently over 5.5 million people in England waiting for treatment or non-urgent surgery, with the Institute for Fiscal Studies (IFS) warning it could rise to 14m by the end of 2022.

Technology has been instrumental in tackling the challenges of COVID-19. The government has also pegged the use of new technology and innovative ways of working as a key driving force to help the NHS to tackle growing waiting lists and treat around 30% more patients who need elective care by 2023 to 2024. ■

Almost a Fifth of UK Patients Embrace Digital Healthcare Post-pandemic

A global study has found that many UK patients have become increasingly open to the use of modern technologies – such as artificial intelligence (AI) - over the course of the pandemic. Almost a fifth (17%) of UK patients have turned away from face-to-face appointments as their preferred method for accessing medical advice and treatment, as trust in modern technologies grows, according to new research from Nuance.

Over the course of the pandemic, the UK's National Health Service (NHS) was forced to transform the way that it delivered patient services. Digital appointments quickly became a part of everyday life for patients, and this led to fundamental shifts in both behaviour and attitude.

As restrictions ease and wider healthcare services resume, ➪

less than half (47%) of UK patients would choose to rely solely on face-to-face appointments. In fact, the poll revealed that 47% of respondents are now comfortable with receiving medical services remotely, with 15% feeling 'very comfortable'.

In this new landscape, phone appointments, video appointments and a mixture of these alongside in-person visits are preferred by two fifths (40%) of respondents. When asked why this was the case, almost half (46%) cited no travel. This was closely followed by the ability to reduce the pressure on health service resources (36%) and speed up the time it takes to access treatment (35%).

Patients Increasingly Embrace Digital Health Technologies

Patients are also increasingly happy with the use of automation and artificial intelligence in healthcare delivery. According to the research two thirds (60%) would now be open to its use to produce clinical documentation, instead of relying on hand-written notes by their doctor.

When asked why they were open to the use of AI, nearly three quarters (71%) highlighted the potential to speed up appointments. 50% said they believed it would help their doctor focus on the diagnosis, while almost a third (32%) felt it would lead to more accurate and detailed medical information. The speed at which these patients have become comfortable with this significant shift in healthcare delivery points towards where the industry is heading.

Quality patient care depends upon detailed and accurate clinical documentation. By enabling medical professionals to compile records using just their voice, AI-powered technologies recognise and record long passages of speech, capturing the complete patient story at the point of care, whilst reducing repetition and supporting standardisation across departments. Given that humans speak at least three times faster than we type, integrating these types of technologies will free up clinicians' time so they

can spend more time seeing patients and delivering quality care.

"Over the course of the global pandemic, the NHS was forced to radically transform the way that it delivered its life-saving services. The new digital practices that emerged from this time of chaos have resulted in long-term changes to patient expectations and preferences," said Simon Wallace, Chief Clinical Information Officer at Nuance Communications. "The industry has evolved and this research indicates that there is no going back."

"Patients have seen the benefits of smarter, tech-enabled services and, as a result, trust in AI-powered solutions to support healthcare delivery is at an all-time-high. Harnessing these solutions, could drastically reduce the clinical documentation burden many clinicians face, meaning time savings for patients and less strain on medical resources. Moving forward modern technologies are set to play a key role in enabling healthcare organisations to meet patient expectations and continue to drive better experiences for both patients and clinicians." ■

Caption Health and Ultromics Partner to Accelerate Heart Disease Detection

Caption Health and Ultromics, leaders in using AI to improve heart ultrasound diagnostics, have partnered in a bid to accelerate cardiovascular disease detection and treatment for more patients in more accessible care settings.

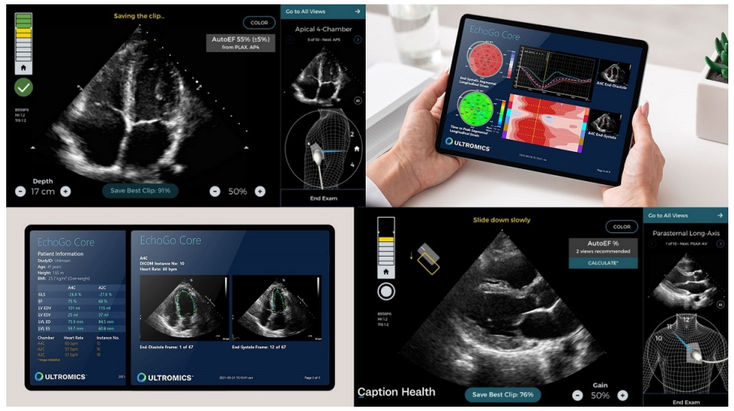
Together, the companies will jointly offer the Caption AI software platform alongside Ultromics' EchoGo deep ultrasound analytics – allowing a broader set of providers the ability to perform ultrasounds and automatically calculate key indicators of heart function, which drive earlier and more accurate disease diagnosis.

Access to proper cardiac health care is a global problem, leading to countless preventable deaths. A limited number of specialists are available to perform and analyze cardiac ultrasounds – a key diagnostic procedure for identifying the beginning or progression of heart failure, valve disease, and coronary artery disease. According to a recent study, 46% of patients in the US diagnosed with heart failure in acute care settings had potential symptoms at primary care clinic visits in the previous six months – these issues were also more prevalent among women and Black patients. Meanwhile in the UK, the National Health Service announced it is receiving £5.9 billion to clear treatment backlogs and improve diagnostic services, reflecting the great need exacerbated by recent global events.

The platforms have already begun changing this landscape. Caption Guidance, which received Breakthrough Device Designation from the FDA, is the leading AI acquisition and guidance software for cardiac ultrasound. Ultromics' EchoGo has dramatically eased the burden on experts by delivering automated analysis of left ventricular volumes, ejection fraction, cardiac strain, and diagnostic support of heart failure and coronary artery disease, saving significant time for users and – most importantly – improving outcomes by reducing variability between operators and equipment.

Now, by linking these platforms, images acquired using Caption AI can be analyzed through Ultromics' EchoGo platform, making advanced diagnostic capabilities that had been limited to experts in specialty care settings and expanding their access to more doctors and patients in more places. In the new year, these integrated capabilities are expected to be available on the Butterfly iQ+ platform, as part of Butterfly Network, Inc. and Caption Health's strategic partnership.

"More efficiently delivered and robust patient care is a necessity for the healthcare system to really improve. This means empowering the entire care team and making diagnostics a key part of care that's more accessible to patients," said Steve Cashman, President and CEO of Caption Health. "With the combination of Ultromics' enhanced analysis and



Caption AI, providers will be able to capture images earlier and get more out of those images, maximizing benefits for patients. Together, we'll help drive the move to earlier detection and diagnosis of cardiac disease in patients – enabling proper management alongside more cost-efficient and timely care."

"EchoGo is already delivering to experts an expansive set of fully automated, advanced clinical analysis and diagnostic support modules," said Ross Upton, Founder and CEO of Ultromics. "This joint agreement will carry our platform beyond the walls of the imaging lab, allowing new providers with less experience the ability to perform diagnostic ultrasounds and gain advanced measurements of cardiac function and diagnostic support, for earlier and more accessible detection of cardiovascular disease." ■

Nordic Nursing Staff Move to Mobile-first Collaboration with Enovacom and Medanets Partnership

Global interoperability leader Enovacom has joined forces with Nordic mobile nursing app specialist Medanets to give frontline nursing staff mobile access to seamless comprehensive patient data. The collaboration will enable safer, more efficient care by providing healthcare staff with simple access to data from multiple monitors and devices and digitising repetitive processes.

Through the partnership, medical device data is automatically gathered using Enovacom's Patient Connect interoperability platform. This is fed through to the hospital's electronic health record (EHR) and to the Medanets mobile nursing app in real-time, giving staff access to comprehensive patient data at the point of care.

The Medanets app enables nurses to capture vital signs and other nursing data on a smartphone, replacing the cumbersome paper-based approaches that nursing staff often have to carry out. The app comes with a broad range of time-saving tools such as task lists, photo uploads and messaging.

The solution has proven to save thousands of hours of time a year for nursing staff across the Nordic region. A recent customer evaluation found that using the standard features of the

app can save at least 70 hours of staff time per month per ward.

The two organizations are already working together at a newly-built development at Central Finland Central Hospital ➪

in Jyväskylä, Finland. Since work began in late 2020, Enovacom has fed data from 1,500 devices into the EHR and Medanets to give clinical and nursing teams accurate and timely data.

"The Enovacom and Medanets solutions are very complementary," said Simon Chassain, Area Sales Manager for Enovacom. "Medanets provides a user-friendly front-end for e-observations and many more nursing activities."

"By helping nurses with tools that are the most time-saving, such as observations, our app becomes an integral part of their workflow. This is delivering huge extra value to our customers," said Juha-Matti Ranta, Chief Executive Officer of Medanets.

Medanets and Enovacom – which is now a subsidiary of Orange Business Services – are looking to work more closely across the collective customer base, as nursing staff become a central part of global moves to a mobile-driven, digital-first approach to frontline care.

Supporting the rise of digital nursing and healthcare interoperability

The rise of the digital nurse has been a feature of healthcare's response to Covid-19. A recent study in the British Medical Journal noted that nurses should embrace technology to maximize the benefits to patient care. Tasks undertaken by nurses that do not add enough value – such as recording observations using pen and paper – may be better integrated into technology enabled processes.

The UK's Health Foundation found that 61% of NHS staff surveyed agreed that the NHS should be looking to build on developments during the pandemic and use technology more in the long term.

Alongside this, there is a global push for greater health IT interoperability. This is exemplified by the Nordic Interoperability Project, which is looking to use digital technology and data sharing to support a more sustainable healthcare system.

A study noted by WHO found that unusable health IT systems are putting frontline healthcare staff off technology, just when it is vital it becomes more widely adopted to meet pandemic-driven demand. User-friendly, interoperable solutions can provide an answer. In response, the new COVID-19 recovery programme EU4Health is looking to widen the use of technology across European health systems.

"Our collaboration with Medanets means we can provide the digital nurse and others with an end-to-end digitised healthcare platform of the future," says Simon. "IT leads can share data from new and existing technology, and have care teams access this at the point of care. This is a clear demonstration of the value of technology in healthcare."

"Enhanced by our work with Enovacom, Medanets provides the mobile nursing app that can give many hospitals an effective and affordable route to digitisation and data-driven healthcare," adds Juha-Matti. "Our partnership means that nurses play a leading role in using data to enhance the quality of care." ■

Aktiia Raises $17.5M for Expansion of its World-first 24-7 Blood Pressure Monitoring System

Hypertension health-tech firm Aktiia today announced a $17.5M Series A round of funding for its revolutionary blood pressure monitoring solution. The company's automated blood pressure monitoring system enables stress-free reading round the clock, offering the potential to transform the diagnosis and treatment of hypertension. The new investment has been earmarked to accelerate adoption of the technology in the UK's NHS and health systems across Europe.

Since its launch earlier this year, Aktiia has gained tens of thousands of users, who on average check their blood pressure data over sixteen times a week, with an average of 150 weekly readings performed by the device automatically in the background. The data is then visualized in a free companion application; with a simple click, a digital summary can be easily shared with a physician or family member.

In contrast, the average hypertensive patient currently measures their blood pressure only once per week due to the inconvenience and discomfort associated with a traditional cuff. Combined with white coat hypertension, masked hypertension, and other common issues with in-office diagnosis, this sporadic at-home monitoring can lead to poor management and delays in optimising treatment.

"I believe we are only scratching the surface of the possible applications for the long-term 24/7 blood pressure data that Aktiia is uniquely capable of providing to physicians," stated Professor Melvin Lobo, NHS Professor of Cardiovascular Medicine and Director of St. Bartholomew's Hospital Blood Pressure Clinic. "This is a game changer in enabling a better understanding of our patients' blood pressure patterns and how to treat them on a personalized basis."

Clinical Validation for 24-7 Blood Pressure Monitoring

In addition to endorsement by leading clinicians in hypertension management, Aktiia is now also an official partner of the International Society of Hypertension.

Its huge potential was further underlined this week when leading peer-reviewed scientific journal Nature Scientific Reports published Aktiia's clinical trial, which validated the optical bracelet in different body positions for the persistent monitoring of blood pressure, cementing Aktiia as a solution for the real-life phenotyping of patients according to individual blood pressure pattern.

As night-time blood pressure measurements are the strongest predictor of cardiovascular risk, and Aktiia is the only easy 24/7 solution that enables these measurements without cuff inflation, this is an incredibly exciting moment for hypertension diagnostics. ■

Ground-breaking Spatial Navigation App offers Free Study Platform for Researchers

After a successful journey gathering data from 4.3 million participating players, Alzheimer's Research UK is making its ground-breaking citizen science app Sea Hero Quest available to researchers for studies of cognition and spatial navigation.

Sea Hero Quest started out in 2016 as a consumer mobile game to help scientists understand navigational abilities across the life course. By building a picture of how navigation ability changes in the general population, players could contribute to research identifying changes characteristic of early Alzheimer's disease.

Originally led by Deutsche Telekom alongside Alzheimer's Research UK and leaders in gaming, technology, academia and research, the award-winning app quickly became a citizen science phenomenon. The new platform creates a bespoke version for researchers.

Tim Parry, Director at Alzheimer's Research UK, helped to bring the app to the public. He said: "We were really humbled by the response. It was more popular than we could ever have expected, and we ultimately collected data from over 117 years of combined game play. People from all over the world downloaded Sea Hero Quest and provided anonymised demographic information so that we now have an incredible wealth of data relating to navigation ability as we age."

This new phase of the project aims to provide researchers with a controllable, sensitive, safe, and easy way to administer digital cognitive assessment of navigation ability. The system allows researchers to create and fully manage prospective studies, invite targeted groups of participants to play through an easily download from the Android or Apple app stores, and provides access to study participants' data in real time.

Parry continues: "While clearly we embarked on the project with dementia studies in mind, we want to mobilise this resource towards the greatest possible benefit for global research. The app is free for researchers in any field, and we have developed a highly-usable study administration dashboard, with guidance and support for those looking to use it in their studies."

Prof Hugo Spires from University College London collaborated in the development and validation of the Sea Hero Quest app. Prof Spires' team has led the analysis of the anonymous player data. He said: "Our validation testing showed that performance in the game is strongly correlated with performance in real-world tasks. While data gathered from citizen science projects is inherently noisy compared to lab research, the unprecedented scale of the project so far means that our benchmarking data far exceeds the accuracy of previous research in this area.

"The citizen science element of this project has already revealed new insights into human spatial navigation at a planet-wide scale. We've found that these abilities are clustered according to economic wealth and gender inequalities globally, and this may have significant implications for cognitive testing in cross-cultural studies and multi-centre clinical trials."

To find out more about how to use Sea Hero Quest for research visit: *www.alzheimersresearchuk.org/seaheroquest* ■

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