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The Digital Transformation of Healthcare

EXPERT OPINION

Brexit: Its Impact on the NHS

INSIGHT

An Internet of Things that Matter

AWARDS

Digital Health Global 100 2016

Welcome

As 2016 draws to a close, it's that time again where we reflect upon the changes that we have seen in the digital health space, this year, and consider what we might expect from the industry going into 2017.

Telehealth could be described as the star of 2016! For years the promise of remote consultations has been debated, but it is only now that we are finally seeing the demand for these services that matches the predictions. With tele-enabled health services popping up across the healthcare ecosystem, it would seem that these technologies could at last become mainstream delivery options. One area that hasn't fared quite so well has been the wearable space. Despite the hype of recent years, many of these technologies are still struggling to find a workable user base, and with a number of big name departures from the space, the arrival of mass appeal wearables seems something for the distant future. Despite this, niche wearables that target specific medical conditions for remote clinical monitoring are growing in terms of demand and use, which is a positive signal for the industry, and one we can expect to continue during 2017.

As the digital health market matures it becomes easier to see which solutions are likely to succeed. Over the past few years there has been something of a gold rush in digital health. Innovations that have demonstrated ingenuity have often lacked a sound business grounding and in particular a strong evidence base by which they can demonstrate their effectiveness. This is changing, and as regulatory bodies catch up with the advances in the digital health market, then it is going to become ever more important for innovators to be able to support their claims with a strong foundation of credible evidence.

In this issue we take a broad look at the digital transformation of healthcare. Bill Rogers, Founder & CEO of Orbita, considers how the Internet of Things and digital technologies are changing home healthcare; Jens Rosenstand, Head of Product Management at Oticon - developer of the world's first internet connected hearing aid, talks about how we go about creating an 'Internet of Things that matter'; and, Dr. Darryl W. Roberts and Dr. David Friedenberg, of Battelle ask can Clinical Decision Support (CDS) tools make doctors, nurses and other healthcare workers smarter and more effective?

The year has also been one of political surprises. A new US administration and an uncertain future for Britain, in Europe, have left uncertainty across both sides of the Atlantic. We address some of these issues with articles that discuss Brexit, and its potential impact on procurement and buying in the NHS and the likely implications a Trump Administration may mean for healthcare organisations.

Finally, may I take this opportunity thank you for your continued support and to wish you a very happy festive season and all the best for 2017, from all the team at The Journal of mHealth!

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In This Issue

Industry News

Digital Health Global 100 2016

How the Internet of Things and Digital Technologies Will Transform Home Healthcare

By Bill Rogers, Founder/CEO, Orbita, Inc.

We're reading a lot these days about the Internet of Things. Is it here yet? When's it coming? How big is it? And what exactly is it? But perhaps the most fundamental question of all is what exactly is the IoT doing to make my life better?

Journalist Christopher Mims discussed this question in a recent Wall Street Journal article titled "The Internet of Things Is Here, and It Isn't a Thing." He makes the point that the IoT is already here, only it's not about having a smart thermostat that can be set via an iPhone. It's really about solutions that take advantage of connected devices and actually do something with the data they generate.

Consider Uber as an example. Even though it's built on connectivity and smart technology in the hands of drivers and would-be riders, we don't think of it as IoT. We think of it as a transportation service, because that's what Uber provides. Clorox is another example. While the company is not introducing a smart bottle of bleach, Mims says, it's Brita unit is bringing a smart pitcher to market that knows when a replacement filter is needed and orders it. Ah, service...

Mims believes that a shift from "describing objects as 'smart and connected' to realizing that they are 'elements of a service offering' allows us to make a prediction that "the next breakout Internet-of-Things company will be another services business." Amazon's success with their Amazon Echo voice assistant device is an early poster child of this.

He goes on to say that home-care and aging-in-place are ripe for disruption because many systems are already in place for tracking health in home environments. "No one is going to sell grandma a new smart connected anything, but selling her children 'peace of mind' for a monthly fee? That sounds like the next Uber, or at least the next Sonos."

Today, countless companies are using IoT technology – sensors, smarts, connectivity – to deliver offerings that solve real healthcare problems for real people. While their offerings may be technology based, make no mistake -- what they offer is a service: helping patients stick to medication schedules, enabling the elderly to stay in their homes, coordinating home care among multiple providers.

What's driving the surge in better home care? Economic forces like value-based reimbursement and accountable care are pushing payers and providers to keep people out of the hospital and lower costs of care. At the same time, a growing elderly population with chronic, age-related healthcare needs is demanding more and better care at home.

The Technical Bedrock of Digital Home Healthcare

If economics and demographics are the driving forces in home health care, technology is the engine revolutionizing how it is being delivered.

Three technology trends, in particular, are the foundation behind this revolution: 1) ubiquitous wireless network connectivity, 2) widespread use of smartphones, and 3) a growing array of connected, sensor-enabled devices that can measure and track a variety of personal wellness data.

Smartphones are an encapsulation of these three technologies in a single form factor. They are connected, portable, personal, and packed with sensors that record step counts, location, ambient temperature, and other data relevant to patient activity and wellness. They are also, first and foremost, a communication platform. Perhaps this explains a recent explosion in smartphone apps for healthcare. According to IMS Health, more than 165,000 mobile health or "mHealth" apps are available in the Apple and Android app stores.

Smartphones are general purpose devices and intrinsically limited when it comes to tracking healthcare data. Over the past few years, hundreds of specialty devices have come on the market that combine wireless connectivity with small, inexpensive sensors to capture and record vital data points like blood pressure, glucose level, movement and activity, and even stress level extracted from patients' voices. All these devices are making it possible to gather a detailed and complete picture of patient wellness at home.

Making it Real – Digital Home Health Applications

Along with keeping costs of care low, digital home healthcare also offers great promise to improve quality of care and outcomes. Quality healthcare happens when medical professionals, caregivers, and patients themselves have access to better and more timely insights into patient wellness. The three core technologies of digital home health combine to provide unprecedented access to patient wellness data and a platform to communicate and coordinate care around these insights. This combination of access to data, connectivity, and communication tools enables mHealth applications for:

- Patient education and engagement
- Medication and treatment adherence
- Condition monitoring and intervention
- Care coordination and management

Completing the "Last Mile" in Digital Health

While connectivity, mobile apps, and smart, sensor-enabled devices enable digital home healthcare, a review of the list above suggests that other technologies are required to deliver a complete solution that actually does something with IoT connected devices.

For example, the ability to deliver the right educational content to a patient at the right time within a mHealth application requires technology for curating the content and setting the rules for its delivery.

More broadly, specific and often-overlooked technologies are required to bring to life the monitoring, education, engagement, and collaboration features required in most digital home healthcare applications. Selecting a platform that has the following technologies built in will make delivering a single cohesive digital care experience much easier:

Social computing

The success of social media applications like Facebook, Twitter, and others have set the digital standard for how people communicate. From this world come important technologies and capabilities that are relevant to coordinating care, managing intervention, and engaging patients at home in their own care; capabilities like messaging, activity feeds, content sharing, etc.

Analytics

Analytics technology processes data from apps and devices to surface insights and inform the actions that should be taken ("actionable insights"). When used in a home healthcare setting, analytics help to identify risks, reduce unnecessary emergency hospital visits for chronic care, and prevent re-admissions for post-acute care.

Content and experience management

Technologies for managing content and user experiences are mature in the digital marketing world and are used to manage, monitor, and measure visitors to consumer web sites and mobile applications. Sometimes lumped under the category of "customer engagement" technologies, these same technologies play an important role in digital home health and "patient engagement". They help simplify the creation and management of rules for patient engagement and help align the patient's home healthcare activities to an established, personalized care plan by delivering the right information at the right time – where and when it's needed most.

Plan Accordingly

Wireless connectivity, smartphones, and smart, connected devices are the current superstars of modern digital home health, but other technologies are also critically important to consider for any viable mHealth application. Organizations that think through the complete requirements of their digital healthcare application and leverage an appropriately complete enabling platform will lead the way in transforming home health.

There's an old marketing dictum that holds that people don't buy products, they buy solutions. For home healthcare, as with so many other markets where IoT is coming into play, those solutions are services. The end users don't really care what's in the box. They just want to know that it works – and what it does for them. The platform is the engine that brings it all together.

About the Author

Bill Rogers is a visionary software executive with a proven record of delivering outstanding shareholder value through innovative growth strategies and strong execution. With a current focus on SaaS opportunities in enterprise markets and healthcare, he has expertise in product management, marketing, technology, mobile health, IoT, customer relationships & M&A.

Rogers is a co-founder and CEO of Orbita which provides a platform for creating and managing smart, connected home healthcare applications. Orbita's purpose-built platform integrates data from wearables, home health devices, and other connected devices into a collaborative care experience that vastly improves patient engagement and care coordination. Orbita provides data-driven insights to enable connected home healthcare applications that are social, personalized, educational and secure. ■

Achieving Service Transformation: Resolve the Digital Paradox

Initiatives to accelerate innovation to the frontline are welcome, but details around funding, technology assessments and integration need ironing out to make rapid health transformation a reality, says IMS MAXIMS chief clinical information officer and chief medical officer Prof. Michael Thick.

Accelerating the adoption of technology at scale and pace has to be a good thing, right?

The UK government's latest proposals for digital health, the Accelerated Access Review (AAR), intends to shorten the time between bench to bedside innovation, and is an encouraging step for technology adoption.

The review shows promise and offers valid solutions. It makes a strong case for collaboration between suppliers and the NHS, to enable end user design from the outset, which in the past has been a challenge. The collaboration must happen much earlier too; a critical factor for clinical engagement and uptake in technology solutions. Simply layering new products onto existing pathways, the review notes, is also no longer viable.

Like any review of this kind, the devil is in the detail. Whist accelerating adoption of technology is welcomed, important questions remain around integration, assessments, funding and the bigger digital picture that will determine how much of a good thing the review will be for the paperless agenda.

From isolation to integration

The AAR is right to highlight that innovations such as patient-facing apps should be encouraged, but we need to address how this fits into the broader transformation agenda for healthcare providers. It is now widely accepted that the adoption of mobile working is part of the future, but standalone, patient-facing apps that do not share data and knowledge with an enterprise solution presents a significant challenge for managing the care pathway. It's also important not to omit apps developed for healthcare professionals, which, when integrated into an enterprise-wide solution delivers significant benefits to the patient, professional and hospital.

Getting value from apps in the delivery of care requires a highly coordinated view, both in clinical and organisational terms. A myriad of self-contained, non-reporting apps makes holistic and informed care, nye on impossible. There are certain functions that undoubtedly a small standalone app would be able to support quite quickly in a hospital environment, but if we are to transform – rather than tinker around the edges – there must be integration with the electronic patient record (EPR). Interoperability and the use of agreed open standards are essential if we are to benefit from these innovations.

Moreover, if apps are to be assessed for effectiveness, they should be done so in the context of the enterprise-wide solution, not in isolation. They also need to include the very people that have the duty to care.

Earlier this year, NHS England CEO Simon Stevens announced funding for apps that would have a positive impact on patient health and care delivery. The next step, and secret to acceleration in this instance, has to be a rapid pathway to get suitable applications in front of the people that will assess and evaluate these apps.

The bigger digital picture

They say a week is a long time in politics. It's also true of health tech, with Sustainability and Transformation Plans (STPs), Local Digital Roadmaps and the National Information Board's 10 domains and 33 programmes, shaping the digital agenda at scale and increasing pace. How does the AAR fit in with these national and local priorities, particularly as there is increasing uncertainty around capital funding? Where will investment come from for the plans set out in the AAR?

It's clear that the digital paradox remains firm: to save money and transform services, the NHS must be 'digital by default', but in order to deploy digital services, organisations must invest. Taunton and Somerset NHS Foundation Trust has embraced the 'digital by default' approach. It has laid solid digital foundations with the deployment of an open source EPR, that enables clinical decision support, ePrescribing, medicine management and more. Through the Global Digital Exemplar (GDE) programme, the trust is accelerating its adoption of mobile working, giving due consideration to how this will impact its staff and digitally-enabled patients along a care pathway.

We are currently working with the trust to deploy a range of mobile clinical functions to enable e-observations for conditions such as sepsis, which will enable faster delivery of healthcare, a more efficient way of working for the clinician, and a much safer journey for the patient, with enhanced quality and experience. Taunton and Somerset is a digitally ambitious NHS trust, with a firm grasp on the importance of interoperability and standards for shared care.

With mental health, ambulance and community trusts in line to join acute hospitals in the GDE programme, NHS frameworks for technology adoption such as the AAR must look at the bigger picture that incorporates an increasingly digital patient, whilst also ensuring that the wider health and care economy can benefit from such innovation. If the AAR gives us the platform to speed up digital adoption, then the GDE programme can be the spring board to deliver integrated care. Therefore, further commitment both in spirit and resource from the government would go a long way to solving the digital paradox. ■

Announcing the Global Digital Health 100

Recognising Innovation in Mobile, Digital and Connected Healthcare

We are delighted to be able to announce our Global Digital Health 100 Award List for 2016.

Over the past three years, the Global Digital Health 100 has become established as an international benchmark of industry activity for mobile, digital and connected technologies in healthcare. This interest from across the industry has meant that 2016 has seen more nominations than in any previous year - with hundreds of companies analysed and assessed to determine which innovators made the final cut.

The 2016 list - compiled from a combination of nominations and industry research by the international team at The Journal of mHealth - sets out to identify the most innovative and disruptive health technology companies, from around the world, operating in the mobile, digital and connected care industries today.

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.

Digital Health is Maturing

Reflecting the ever-growing importance of mobile, digital and connected solutions in the healthcare industry, the Global Digital Health 100-2016 recognises the significant work being carried out by organisations from around the globe. This year's list also identifies an industry that is showing the signs of maturity. While many companies, over the past few years, have failed despite having truly innovative technologies to offer, the 2016 cohort shows that it is essential to not only demonstrate innovation in technology, but also innovation in service and business model development as a requisite to succeeding as a technology company in the healthcare industry.

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 digital health 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.

Download the full 2016 Digital Health 100 Award List at *www.thejournalofmhealth.com/digital-health-100* ■

The 2016 Global Digital Health 100 List

Company Name	Location
AdhereTech	USA
Airstrip	USA
Alivecor	USA
Allscripts	USA
American Well	USA
Ayogo	Canada
Babylon	United Kingdom
Biosensics	USA
Biotricity	Canada
Biotronik	Germany
Breaking Free Group	United Kingdom
Cambridge Cognition	United Kingdom
Cera	United Kingdom
Change Healthcare	USA
Clearwater Clinical	Canada
Cupris Health	United Kingdom
dacadoo	Switzerland
DashMD	Canada
Deontics	United Kingdom
Dexcom	USA
diabetacare	United Kingdom
digitalMedLab	Switzerland
Doctoralia	Spain
Doctrina	Slovenia
DoseMe	Australia
EarlySense	Israel

Company Name	Location
eClinicalWorks	USA
eMocha	USA
EMSRelay	USA
Equicare Health	Canada
eTreatMD	Canada
Exco InTouch	United Kingdom
Flow Health	USA
GAIA	Germany
Gesturetek Health	Canada
HCi Viocare Technologies	United Kingdom
Healthera	United Kingdom
HealthNet Connect	USA
HealthTap	USA
iMDsoft	USA
Imprivata	USA
InHealthcare	United Kingdom
Isansys	United Kingdom
Janssen Research & Development (Care4Today)	USA
LifeBooster	Canada
LiveSmart	United Kingdom
Lumeon	United Kingdom
M3 CLIC	United Kingdom
mc10	USA
Medable	USA
Medanets	Finland

The 2016 Global Digital Health 100 List

Company Name	Location	Company Name	Location
Medelinked	United Kingdom	Push Doctor	United Kingdom
Medial EarlySign	Israel	Qardio	USA
Medic Creations	United Kingdom	ResApp Health	Australia
Medic Mobile	USA	roadtohealth (Quealth)	United Kingdom
Medidata	USA	RxAnte	USA
Medivizor	USA	Seamless MD	Canada
medopad	United Kingdom	SilverCloud Health	USA
Mezzanine Ware	South Africa	SmartPatient	Germany
MIRA Rehab	Romania	SmartWard	Australia
Molecular Warehouse	United Kingdom	sweetch	Israel
mySugr	Austria	Teckel Medical	Spain
Natural Cycles	Sweden	Telcare	USA
Nervecentre Software	United Kingdom	TeleMedCo	USA
NexJ Health	Canada	Tiatros	USA
Omada Health	USA	Touch Surgery	United Kingdom
OURPATH	United Kingdom	TruClinic	USA
Oxehealth	United Kingdom	UMANICK	Spain
Patients Pending (Timesulin)	United Kingdom	Validic	USA
		Visible Health	USA
peek	United Kingdom	Vision	United Kingdom
Philips	Netherlands	Vivify Health	USA
Physitrack	United Kingdom	Wellbe	USA
Practice Fusion	USA	Wellframe	USA
Propeller Health	USA	xbird	Germany
psious	Spain	Your.MD	United Kingdom

INDUSTRY NEWS

News and Information for Digital Health Professionals

Asthma Intelligence Benefits Pharmas as Aerobit Teams with Big Data Specialists

Pharmas are set to benefit from insightful intelligence on asthma as Aerobit, provider of the Smart Respiratory Device, teams with leading artificial intelligence experts to unlock the potential of big data.

To more effectively manage asthma care, Aerobit has introduced a smart inhaler which tracks medication use and records each time an inhaler is taken by an asthma patient. Patients receive reminders and alerts for their prescribed medical regime and their doctors are able to track treatment progress and compliance.

Recognising the value of big data, Aerobit has teamed with leading artificial intelligence experts Eularis, to enable pharmaceuticals to gain a deeper understanding of patient needs, drug efficacy and adherence, and real world data to drive accelerated growth for asthma drugs.

Ali Moiyed, Aerobit chief executive said, "We are delighted to be working with Eularis. By combining our expertise, we are able to offer pharmas valuable intelligence relating to asthma. This offers great potential to guide product development and improve the quality of lives for the 5 million asthma sufferers within the UK alone."

Dr. Andrée Bates, President at Eularis, a leading expert in pharmaceutical big data analytics, states, "Our data partnership with Aerobit provides Pharma with accurate, real time, cutting-edge analytics that identify the real needs of asthma patients to enable informed strategic business decisions to deliver stronger outcomes for both the patients, and their own business results." ■

Exco InTouch Granted US Patent for its Ground-breaking Mobile Health Solutions

Exco InTouch has been granted a US patent corresponding to its mobile health solutions, including methods for providing condition-specific adaptive content and health support for patients, healthcare professionals and other stakeholders in the healthcare industry.

Exco InTouch is the established leader in its field and has driven innovation in the clinical trial industry through pioneering the use of mobile technology for patient engagement and data capture. Following the proven success of its platforms in clinical trials, the strategic decision was taken to bring the benefits of its technology to patients in healthcare settings through the development of mobile health programs. The granting of its US patent will further accelerate Exco InTouch's leadership in this market.

Tim Davis, CEO of Exco InTouch, commented, "We are delighted to have been granted this patent and look forward to continuing to bring the benefits of our ground-breaking digital health solutions to patients and key stakeholders in the healthcare community."

He continued, "We are committed to shaping this market through innovation in advanced mobile and digital technology. As a consequence, we are pleased to have taken a lead in developing platforms which serve individual patient needs and specific therapy fields, and which connect all the key healthcare stakeholders together – achieving the primary goals of enhancing the patient experience and enabling them to better control their conditions."

At its core Exco InTouch's mobile health technology brings distinct advantages to the market. Most crucially it provides adaptable solutions that can be tailored to any therapeutic area, incorporating the most appropriate tools - such as education, alerts, goals, progress tracking and patient monitoring - through role-based access and reporting, selected for each individual program. This is in stark contrast to generic health support platforms that provide access to a wealth of general information that is not tailored to the individual reader.

The company's digital health platforms are designed to enable healthcare providers to make more informed decisions - tailoring care pathways and solutions to each individual patient, supporting long-term condition management and driving better healthcare outcomes.

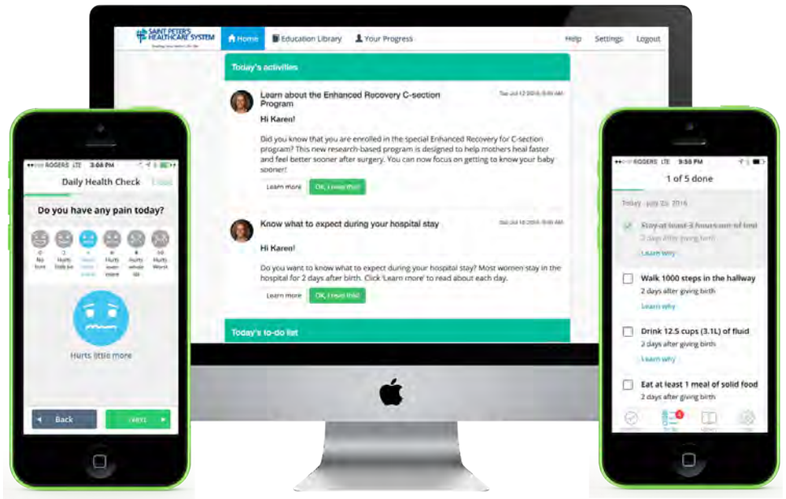
Exco InTouch's modular approach to building digital health solutions, enables configuration and delivery of disease management programs that can support all stakeholders in the care pathway – patients, caregivers, healthcare professionals, providers and payers.

The latest example of Exco InTouch's mobile health platforms is Target My Hives, a digital healthcare network available on both Android and iOS. This has established the first ever chronic urticaria digital health community that brings together patients, physicians, advocacy groups and support networks. The online network enables wider communication between patients and the sharing of experiences - breaking down their sense of isolation and providing help.

This latest community was built from a history of groundbreaking programs for the pharmaceutical industry including Me&MyCOPD which pioneered the concept of 'beyond the pill'. This collaboration with AstraZeneca was developed to help patients manage chronic obstructive pulmonary disease to track and better manage their conditions, use their medical devices, organise their clinic visits efficiently and view information on how to deal with different lifestyle issues. ■

Saint Peter's Partners with SeamlessMD to Implement ERAS Program

Saint Peter's Healthcare System has selected SeamlessMD's patient engagement platform to launch its new enhanced recovery after surgery (ERAS) program and extend the support of the hospital into its patients' homes.



Enhanced recovery after surgery (ERAS) programs integrate evidence-based interventions into multidisciplinary care plans for the perioperative pathway. A large body of research has shown ERAS programs to reduce hospital length of stay and patient morbidity.

Saint Peter's, which operates one of the largest maternity services in New Jersey and New York region, is one of the first healthcare systems in the country to provide an ERAS program for caesarean section patients. The healthcare system is also expanding its ERAS program to support patients having major colon surgery, gynaecologic surgery and other major surgeries. Since September, patients enrolled in Saint Peter's ERAS program have had access to the SeamlessMD platform on their smartphone, tablet or computer, and they are guided through every step of the ERAS pathway.

The SeamlessMD platform supports patients through preparation, in-hospital care and at-home recovery using reminders, tasks, progress tracking and feedback. Saint Peter's can track their patients' progress in real-time, intervene sooner for at-risk patients and monitor the success of its ERAS program using advanced reporting and analytics.

"When we decided to implement ERAS at our healthcare system, we wanted to do more than just implement the protocols," said Attila Kett, MD, medical director of obstetrical anesthesia at Saint Peter's. "We needed a way to effectively educate our patients, measure their compliance and continuously improve our program over time. We chose SeamlessMD because of its terrific patient experience, the robustness of the platform and the clinical research supporting their system for ERAS."

"Our patients are eager for technology to support them outside the hospital," said Elizabeth Cherot, MD, the obstetrics and gynecology champion for the program. "With SeamlessMD, we are able to deliver a higher quality patient experience, help our patients recover faster and keep a closer eye on our patients who can be vulnerable to problems after surgery."

Implementing an ERAS program is a significant undertaking for a healthcare system, requiring improved coordination between providers, more comprehensive patient education and increased data collection needs. SeamlessMD's robust platform, which incorporates multimodal patient education, automated data collection and advanced reporting, will enable Saint Peter's to streamline their implementation of ERAS across different surgery programs.

"Our healthcare system is focused on continuous quality improvement, and to do that, our team must have the right data and the right tools," said Howard Lakritz, MD, chairman of anesthesia for Saint Peter's. "The SeamlessMD platform is accelerating our implementation of ERAS across the healthcare system and enabling us to continuously measure and improve the effectiveness of our ERAS program for our patients."

"SeamlessMD is honoured to support Saint Peter's and their mission to deliver the best care possible for their patients," said Joshua Liu, MD, CEO of SeamlessMD. "We are excited to help Saint Peter's partner with their patients on the road to recovery."

SeamlessMD also recently announced a partnership with the Ottawa Hospital and the Bariatric Medical Institute to extend their support for bariatric surgery patients through the use of patient engagement solutions. The partnership will allow patients enrolled in Ottawa's bariatric surgery program to have access to the SeamlessMD platform on their smartphone, tablet or computer, in order to keep them on track with key steps in their bariatric journey. ■

3M and Verily Collaborate to Develop Population Health Measurement Technology

3M Health Information Systems, and Verily Life Sciences (formerly Google Life Sciences), have entered into a strategic agreement to develop new population health measurement technology for managing clinical and financial performance.

The joint technology platform will be designed to analyse quality performance data across healthcare delivery systems and patient populations, and deliver meaningful information that can be used to promote real and sustainable improvements in healthcare quality and cost.

"At 3M, we are constantly evaluating how health information technology can help improve the efficiency, quality and cost of delivering care," said Jae Lynn Williams, vice president and general manager, 3M Health Information Systems. "This collaboration reflects our commitment to continued innovation in health information systems that address real-world problems facing health care today, while protecting the privacy and security of health data."

The joint technology platform will build on 3M's extensive experience in health data coding and classification and its industry-leading risk stratification methodologies, which are used by federal agencies, hospital associations, and state Medicaid agencies for hospital quality reporting and as the basis for new outcomes-based payment models. Verily will apply its deep domain expertise in data analytics and the development of software tools and algorithms to help make this health data useful and actionable.

Together, 3M and Verily will work to transform population-level health data-sets into manageable and prioritised information so that participating hospitals, health systems, payers, regulators and strategic partners can evaluate performance, reduce waste and identify areas that impact efficiency, quality and cost.

"We have the data analytics and software to understand trends and make predictions across large quantities of data, and we see a clear opportunity to apply this approach to health data for insights that can impact care," stated Tom Stanis, head of software and analytics at Verily. "Together, with 3M's know-how and deep expertise in parsing and coding clinical data, we imagine a world where providers have precise information to guide focused improvement, and can consistently access objective, actionable feedback to make informed decisions."

The 3M and Verily platform will be designed to include quality measures that assess complications, readmissions and mortality, and cost measures like length of stay and specific service line costs. It will evaluate multiple performance measures across departments, procedures and practitioners, including downstream providers such as specialists, home health and transitional care facilities. ■

Abbott Announces European Launch of the LibreLinkUp App

Abbott recently announced the launch of the LibreLinkUp app, enabling caregivers and parents to receive glucose readings on their Android smartphone whenever a loved one or child scans a FreeStyle Libre sensor using the LibreLink app.

Developed in partnership with Newyu, Inc., LibreLinkUp provides caregivers with the ability to connect with their loved ones and remotely monitor glucose data and trends on their Android smartphone.

According to a survey[1] of 600 parents, parents of children with diabetes often worry when their child is away from them. More than half of parents worry their child will not test their glucose levels often enough when they are away and 42 percent worry their child will have an episode of hypoglycaemia (low blood sugar) or hyperglycaemia (high blood sugar)—both of which can become life threatening.

By enabling the sharing of glucose data, the LibreLinkUp app is designed to better engage caregivers with their loved ones' diabetes management when they are away from their loved one. Approximately 10% of NHS healthcare expenditure relates to diabetes, with 80% of those costs incurred in treating potentially avoidable complications, including hypoglycaemia[2]. Recent figures published by Public Health England revealed that 3.8 million Britons have been diagnosed with diabetes and that hypoglycaemia, and other complications, costs the NHS almost £10bn a year.[3]

"The introduction of the FreeStyle Libre product was a tremendous breakthrough for those living with diabetes," said Dr. Nandu Thalange, consultant paediatric endocrinologist, Norfolk and Norwich University Hospital. "The addition of

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LibreLinkUp is another step forward, particularly for those who need help managing their condition, such as children or the elderly. Being able to share your glucose readings with a loved one or healthcare professional, provides not only peace of mind but also the potential for better diabetes management."

Access to Glucose Readings and Trends

Anyone can download the LibreLinkUp app for free, but caregivers must be invited by a LibreLink user in order to connect to the LibreLink user's account to start receiving glucose information.

When caregivers open the LibreLinkUp app, they will be able to see the latest glucose reading from their connections, the time the reading was taken, and an arrow indicating which direction the LibreLink user's glucose is trending. The LibreLinkUp app allows caregivers to make connections with up to 20 LibreLink users.

The LibreLinkUp app enables caregivers and parents to:

- Remotely monitor the loved one's glucose readings and trends, and be notified of glucose changes day and night
- Receive notifications when the loved one's glucose readings are too high or too low
- Stay connected to help them better manage diabetes

"At Abbott we look at all aspects of good health—for diabetes, that includes not only the person with the condition but also the people around them who play an active role in their daily diabetes management," said Mark Jesser, director of New Product Innovation, diabetes care, Abbott. "LibreLinkUp was designed to enable a convenient method to connect a person with diabetes with their vital support system."

Differences between LibreLink and LibreLinkUp

LibreLink, developed in partnership with AirStrip, obtained CE Mark (Conformité Européenne) and launched earlier this year across Europe. LibreLink is the first and only approved mobile app by Abbott that can scan and receive glucose information directly from a FreeStyle Libre sensor and display it on a smartphone without having to use a separate reader. The LibreLinkUp app is designed for caregivers and parents to enable them to receive glucose readings on their smartphone whenever a loved one scans a FreeStyle Libre sensor using the LibreLink app.

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Mount Sinai Debuts RxUniverse, a Platform to Prescribe Apps

Mount Sinai Health System has announced plans to create a sustainable, enterprise-wide platform that allows physicians to prescribe medically reviewed mobile health apps to patients.

Called RxUniverse the platform is just one part of an ecosystem dubbed NODE Health — for Network of Digital Evidence. NODE Health is intended to "be an academic home for evidence in digital medicine," according to its website.

"This is the first time a health system has embraced a platform where prescribers can prescribe apps," said Dr. Ashish Atreja, chief technology innovation and engagement officer in Mount Sinai's Department of Medicine and director of Sinai AppLab. "This is a turning point in digital medicine."

In addition to apps, users can prescribe personalised educational material, patient satisfaction surveys and other documents to individuals or populations, according to Sinai AppLab.

Clinicians at Mount Sinai have indeed embraced RxUniverse. When the organisation started a series of six-week pilots of the platform in August, Sinai AppLab had set a goal of getting practitioners to prescribe apps to 100 patients.

"We ended up prescribing to 2,500 patients in five sites in Mount Sinai — way more than we thought we would achieve," Atreja said. "It seems like there's so much hunger among patients to use digital medicine," he added.

The in-house Sinai AppLab and Mount Sinai Innovation Partners are also launching a startup company, Responsive Health, to commercialise and license the technology to other healthcare providers.

Outside of Mount Sinai, Responsive Health will make the RxUniverse platform available starting at the beginning of 2017. The idea is that other health systems can adapt the platform to their own needs. "We are not [a] marketing or delivery arm so we cannot support this kind of toolkit outside of Mount Sinai," Atreja explained. That is the role of Responsive Health.

Medical and IT leadership at Mount Sinai are vetting all the apps listed for their own clinicians. "We only wanted curated apps," Atreja said.

Responsive Health will leave the curation up to each customer. "We defer to each organisation to curate their own apps. We just give guidance," Atreja said. "We are giving empowerment back to the health systems."

RxUniverse and Responsive Health users can filter apps by several measures, including medical evidence, FDA clearance and whether the apps connect to patients, physicians or both. The AppLab is is fitting the prescribing process into clinician workflow, including linking the RxUniverse platform with the health system's electronic health records.

Patients get text confirmations of app or information prescriptions and a link where they can download them. Sinai clinicians can track whether messages are opened, Atreja noted. "We are just solving a delivery problem," he said.

Vishnu Saxena is a director for digital medicine and business innovation at NODE Health. Asked if he expects other health systems to follow in Mount Sinai's footsteps, he said: "I would not be surprised if RxUniverse sets the stage for digital medicine adoption and transformation among many other health systems in some shape or form — in fact, that is the intended broader goal."

Source: Medcity News ■

InHealthcare Launches New Mobile App to Help Patients Manage Long-term Conditions

Digital health specialist Inhealthcare has launched a new mobile app to help UK NHS patients track, monitor and manage long-term conditions including high blood pressure, diabetes and obesity.

The app, My Inhealthcare, allows people to send health readings to their doctor or nurse and receive dosing instructions. This means patients can stay on top of their health without the hassle of inconvenient and time-consuming hospital or clinic appointments.

My Inhealthcare tracks INR and blood glucose levels, heart rate, blood pressure and oxygen levels and weight. As well as using the app to send and receive information, patients can set reminders to take their medication and health readings. The app also allows users to keep a daily diary as they track, monitor and manage conditions.

Bryn Sage, chief executive of Inhealthcare, said: "My Inhealthcare is a powerful tool which helps people with long-term conditions to lead more independent lives."

"Instead of attending regular appointments at hospital or clinic just to provide basic indicators and receive simple information, patients can now harness the power of technology to do this remotely using their smartphones. They can use the app's calendar to manage their lifestyle and have reminders to take their readings and medication. We believe that empowering people to take more control over their own health can have a transformative effect on their wellbeing."

"If adopted widely, My Inhealthcare could also have a transformative effect on the NHS by vastly reducing the number of routine or mundane appointments."

My Inhealthcare can be used for a range of conditions including atrial fibrillation, thrombosis, diabetes, obesity and tracking of vital signs including blood pressure, heart rate and Sp02.

Patients use a registration code to connect to their surgery that is provided by a GP or nurse. Patient data is then fed directly into patient records using Inhealthcare's national digital health platform. If readings fall outside of set parameters, clinicians are alerted for follow-up. ■

Outcomes Platform Selected to Join NHS Innovation Accelerator

A technology developed in the UK has been selected for a national NHS acceleration programme to help measure if care is making a meaningful difference to people and to empower the NHS to prevent diseases, reduce severe illness and improve quality of life.

NHS England Medical Director Professor Sir Bruce Keogh and US digital health expert Professor Robert Wachter revealed in November eight health innovations to join the NHS Innovation Accelerator for 2016.

The innovations selected to join the programme include OBH's 'Outcomes Platform'- a web-based, population health analytics product, which measures whether care provided is making a meaningful difference to people's lives.

The technology supports healthcare systems, such as commissioners and care providers, who are actively working towards building 'value based healthcare' models in their organisations. It enables health systems to organise care between different providers more effectively, around outcomes that are important for people and populations.

The key focus for OBH is to shift measurement and reimbursement away from simply volume of illness treated (typically described as a "sick-care" model in healthcare), towards improving people's health. This includes preventing disease, reducing severe illness, improving quality of life, and feeling able to confidently manage their health conditions.

Dr Rupert Dunbar-Rees, the CEO and founder of Outcomes Based Healthcare, said: "Being selected by NHS England as one of its eight innovations for 2016, is a fantastic opportunity to move to rewarding NHS organisations not only for the great work they do to treat patients, but for the serious efforts being made to prevent serious adverse events.

"This reflects the huge amount of hard work the NHS is now putting into defining, measuring and paying for the things which actually matter to people."

Last year, the programme selected 17 innovations and supported their roll out across over 380 NHS organisations, benefiting millions of NHS patients.

Each of the innovations are evidence-based and cost-saving and focus on providing solutions to key challenges facing the NHS, including better prevention of ill health, improved management of long term conditions and early intervention into diseases.

The announcement has been welcomed by NHS England Chief Executive Simon Stevens, who said: "Necessity is the mother of invention, and health care worldwide is now fizzing with smart innovation. In the NHS, we're now taking practical action to develop and fast track these new techniques into mainstream patient care."

The NHS Innovation Accelerator is led by NHS England, delivered in partnership with the country's 15 Academic Health Science Networks (hosted by UCLPartners) who facilitate and support health innovators with getting their innovation rolled out across the NHS.

The accelerator aims to meet the commitment set out the Five Year Forward View to create the conditions and cultural change necessary for proven innovations to be adopted faster and more systematically through the NHS.

Also commenting on the announcement, Sir Bruce Keogh, NHS England's National Medical Director, said: "With rising demand and escalating costs, innovation is not an option but a necessity if we are to build a sustainable NHS. The innovations selected for this programme have the potential to deliver better value for the taxpayer whilst making patient interactions with the NHS safer and more personal."

Speaking at the launch event in November, Professor Robert Wachter, said: "The work you are doing is extraordinarily important. I think it's the only way that the NHS will be able to achieve the goals of the Five Year Forward View and even beyond that to develop a health care system for the people of England and the UK that delivers the best, highest quality, safest, most satisfying, accessible care for the lowest possible cost." ■

HICOM Launches Community Module at Diabetes Professional Care 2016

Community services have long been hailed as the knight in shining armour that can transform the UK's NHS. In line with widespread Public Health initiatives aimed at shifting emphasis away from emergency care and towards disease prevention, community services can play a significant part in transforming patient/NHS engagement to alleviate the burden on critical NHS resources.

Technology is proving to be a powerful stimulus to enhance communication across the health and social care system and, based on 20+ years of working with diabetes professionals, software and consultancy provider Hicom is now launching a Community Module that helps Health Care Professionals (HCPs) utilise mobile to care for diabetes patients out in the community.

The Community Module is an app extension of Hicom's adult and paediatric diabetes patient management systems, Diamond and Twinkle. Specifically designed to improve the patient experience, the app enables Diabetes Specialist Nurses (DSNs) and GPs with a Special Interest (GPwSis) to take care directly to or near to their home, while still being able to connect to the information stored in Diamond and Twinkle. Crucially, this can be done without breaking the security needed when taking data out of the hospital network.

Installed on a tablet or laptop, the app allows a patient list and relevant patient information to be encrypted and downloaded to the device, which can then be used away from the hospital setting. Patient data in the form of height, weight, HbA1c levels and other key information can be taken during the patient visit and is automatically synchronised back into Diamond or Twinkle when a suitable and secure connection is available. This removes the need for HCPs to make manual notes and spend

valuable time typing these up at a later date. The technology not only reduces the duplication of effort but also the possibility of transcription errors.

John Sanderson, Director at Hicom comments: "Strong community services are a vital component of an effective model of integrated health and social care. Giving accurate, secure and real-time access to patient information will not only empower community-based diabetes professionals, but help them make the most appropriate treatment decisions that can alleviate avoidable hospital admissions and enhance health outcomes.

"We are always looking for innovative ways to help improve diabetes care and support the NHS in providing more efficient, effective and joined-up services", continues John. "The use of mobile tools in diabetes community services can undoubtedly impact where it matters most, and that is patient care." ■

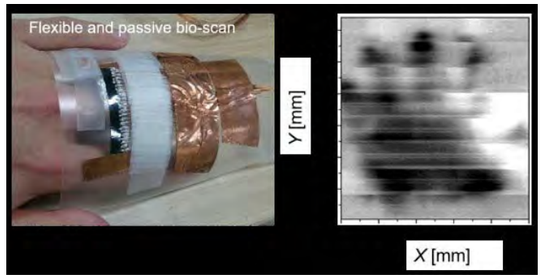
Researchers Develop Wearable Terahertz Scanning Device for Inspection of the Human Body

Scientists at Tokyo Institute of Technology have developed a portable and wearable terahertz scanning device made using arrays of carbon nanotubes, for non-invasive inspection of three-dimensional objects without requiring bulky peripheral optical components.

The device is expected to have wide ranging applications including the non-invasive inspections of medical and drug delivery equipment such as syringes, as well as in medicine for imaging cancer cells, blood clots, sweat glands, and teeth. The findings are published in Nature Photonics, November 2016.

Imaging devices based on terahertz waves show promise for non-invasive inspection of solid objects and soft tissue of the human body. However, terahertz waves have difficulty in imaging and reproducing the curved contours of three-dimensional objects. Furthermore, terahertz devices currently used for whole body scans at airports must rotate 360 degrees around the human body, and thus they are large, bulky, and not portable. In addition, the materials used to fabricate conventional terahertz systems are not flexible, and the terahertz detectors, must be cooled in order to achieve high detection sensitivity.

Therefore, researchers are constantly searching for ways of producing terahertz imaging system that are portable, flexible, and operate efficiently at room temperature. To address these challenges, Yukio Kawano and colleagues at the Laboratory for Future Interdisciplinary Research of Science and Technology, Tokyo Institute of Technology, have demonstrated a terahertz imaging device fabricated with arrays of carbon nanotubes (CNT). Notably, CNTs have previously been used for the fabrication of photodetectors that operate in the visible, infrared, and



terahertz regions of the electromagnetic spectrum.

The Tokyo Tech team fabricated a flexible, wide-band terahertz scanner by integrating 23 CNT detector elements into a single array. The mechanical strength of the CNT film used in the detector enabled it to be readily bent over a wide range of angles, unlike conventional semiconductor materials that are fragile and break under stress. Importantly, the CNT films also absorb electromagnetic radiation over a broad terahertz range, which eliminates the need for planar antennas to scan objects.

The terahertz scanner developed by Kawano and his team was successfully used for active imaging of flat and curved samples; multi-view scanning of cylindrical samples; and passive wearable imaging of a human hand.

In the future, the research team expects that the applications of their terahertz scanner will enhance the capability of non-invasive inspections in pharmaceutics, food quality control, and medical monitoring. ■

NHS Trust Partners with Xerox in Move towards Paperless Communication with Patients

More than 75,000 patients of Imperial College Healthcare NHS Trust are now able to receive their appointment notifications and reminders via email rather than traditional post, as part of a new partnership with Xerox.

Imperial College Healthcare NHS Trust sends out more than 1.5 million pieces of post a year related to patient appointments. The project aims to cut this number dramatically by giving patients greater choice in how the Trust communicates with them. It will also save the Trust an expected £1million over four years on postage costs.

Xerox is helping the Trust to transition patients to email-based communication, enabling them to receive appointment details more quickly and conveniently. For each appointment Xerox software checks if a patient has consented to email based communication and then automatically sends out an email if the patient has opted in, if not a letter is sent.

The Trust has started to use self-check in kiosks across its clinics to secure patients' consent to move away from paper-based communications. This will help the Trust streamline its patient communications operation, and support the UK Government's vision for a digital NHS by 2020.

For those patients still choosing to receive postal appointment details, the mailing process has also been streamlined through the implementation of Xerox technology. Using its secure shared delivery centres, Xerox has created a centralised, digital resource for postal mail management to ensure that all patients receive correspondence without delay or error. By identifying incorrect or incomplete mailing addresses before letters are posted, Mailmark barcode technology tracks letters to ensure patients receive appointment details in time.

"This is a very exciting development for the Trust and more importantly our patients – many of whom have expressed a desire to receive correspondence electronically in the past," said Kevin Jarrold, chief information officer, Imperial College Healthcare NHS Trust. "In February we began recording patients who told us they wanted to be contacted electronically using our self-check in kiosks which are widely available at clinics across our hospital sites. More recently, we have emailed patients asking for permission to send all future correspondence to them electronically.

"We are already seeing the positive impact this programme is having on patient experience, making it more effective and personal from the onset. We're looking forward to building on this success and making electronic appointment correspondence available to more patients over the next few months."

Andrew Morrison, U.K. managing director, Xerox said: "Through our work with Imperial College Healthcare NHS Trust we aim to strike a balance between streamlining the paper process through automation, and helping the Trust transition to a digital future. The ultimate aim is to find the most effective way for the Trust to communicate with its patients and in doing so help to reduce the number of missed appointments."

It is estimated that by the end of the year, 150,000 Trust patients will have signed-up to receive appointment correspondence and alerts electronically. ■

Eye Care App that is Transforming Millions of Lives Recognised in 40th Anniversary Rolex Awards

Ophthalmologist Andrew Bastawrous - whose team's smartphone-based portable eye examination system, Peek Vision, is radically changing eye care in sub-Saharan Africa and other resource-poor settings - is among 10 innovators from around the world who have won Rolex Awards in the 40th anniversary year of the programme.

At least 280 million people worldwide are visually impaired, 39 million of these people are blind and yet 80% of blindness is avoidable. Peek is a smart-phone based portable eye examination kit for comprehensive eye examinations in even the remotest of settings.
Developed by a team of ophthalmologists, engineers, software developers and researchers the team at Peek share a common goal which is to expand access to high quality eye care, empower all health workers to diagnose eye diseases and simplify managing and monitoring treatment of patients anywhere in the world, by harnessing mobile phone apps, hardware and rigorous scientific testing.

Peek Vision are collaborating with a variety of institutions to carry out their vital research and development work including the London School of Hygiene & Tropical Medicine, University of Strathclyde and the Glasgow Centre for Ophthalmic Research.

The Rolex Awards are an international philanthropic programme that supports new and ongoing projects by individuals taking on major challenges to benefit mankind. It has served as a benchmark for corporate philanthropy the world over for four decades.

The winners were chosen by an international Jury of 12 eminent experts who selected them after meeting with the finalists who had been shortlisted from among 2,322 applicants representing 144 nationalities. Each Laureate receives 100,000 Swiss francs (US$104,000) and each Young Laureate 50,000 Swiss francs ($52,000) to advance their project. ■

Cerner and American Well to Embed Telehealth Capabilities into Cerner EHR

Cerner has announced a telehealth agreement with American Well, to deliver a virtual health care experience that will integrate the American Well platform with Cerner's electronic health record (EHR).

The integration will enable providers to manage the health and care of patients beyond the walls of the health system. "Cerner and American Well share the belief that all aspects of health care delivery should be unified, continuous and patient-centred. Together, we're committed to developing a long-term strategy to align American Well's telehealth technologies, services and programs to deliver an enhanced user experience within the Cerner EHR and ecosystem," said Don Bisbee, senior vice president at Cerner.

"Our alliance with Cerner and deep integration between the electronic health record and telehealth visit is one of the industry's first. We look forward to a long-term, collaborative relationship of deploying advanced telehealth solutions that add greater value for our joint health system clients along with their patients and providers," said Dr. Ido Schoenberg, chairman and CEO of American Well.

The integrated EHR-telehealth solution will be available to current and future Cerner and American Well clients. Patients will interact with the solution through Cerner's HealtheLifeSM patient engagement portal, which is designed to provide access to health information, provider messaging and broad interaction with care teams. ■

Zebra's Machine Learning Algorithms to Provide an Instant Second Opinion on Patient Scans

Zebra Medical Vision has announced the launch of Profound – a breakthrough service intended to help millions of people receive fast, accurate medical image analysis nearly instantly, over the web. The company's new service allows people to upload their medical imaging scans such as CTs and Mammograms to Zebra's online service, and receive an automated analysis for key clinical conditions.

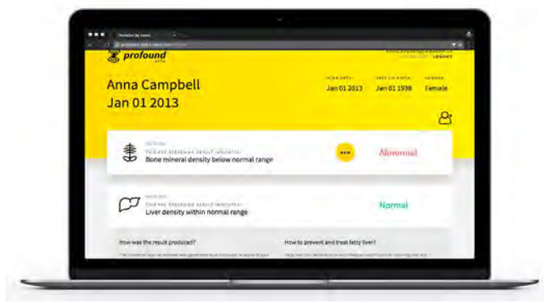
Unlike its competitors that are still gathering data from hospitals, Zebra has already collected a vast amount of anonymised patient data from hospitals and clinics around the world, and is using it to create a one of a kind open platform for imaging data algorithms that will transform the way doctors discover and treat diseases.

"We are all anxious about our health. Undergoing an imaging scan such as a CT or a Mammogram is stressful for many people, often compounded by a long wait for results, with additional follow-up tests and examinations." said Elad Benjamin, co-founder and CEO of Zebra Medical Vision. "Profound can help alleviate some of the anxiety involved by providing a second opinion for certain scans, or discovering key findings which were overlooked in others."

Profound, will allow users from Europe, Asia, the Pacific Rim and Latin America to receive analysis highlighting the presence of the following conditions, by simply uploading these scans to the Zebra platform:

- Osteoporosis: Low bone density that is often found in men and women above the age of 55, and is accompanied by higher susceptibility to hip or other bone fractures
- Compression Fractures: Fractures in the vertebral arteries that indicate Osteoporosis has already set in and should be examined more closely.
- Fatty Liver: A condition often associated with pre-diabetics, and a warning signal for some who may develop advanced liver disease.
- Coronary Calcium: Presence of calcium deposits in the coronary arteries are a strong predictor of cardiovascular events such as a heart attack or stroke.
- Aortic Aneurysms: A bulge in the main blood vessel carrying blood from our heart to the rest of our body. If the aorta bursts, serious bleeding occurs, which can quickly lead to death.
- Additional algorithms, such as analysis of mammograms, are planned for the future

"Our analysis does not replace a physician or a proper medical examination. We urge anyone who is suspicious in any way of their health condition to seek professional medical advice," Mr. Benjamin added. "But with Profound, we hope to empower users to better manage and understand their health, promoting a better discourse with their physicians, which will lead to better care for everyone."



Zebra Medical Vision uses big data to deliver large scale clinical research platforms and next generation imaging analytics services to the healthcare industry. Its Imaging Analytics allow healthcare institutions to identify patients at risk of disease, and offer improved, preventative treatment pathways to improve patient care.

In the past five months, the company has raised $12M for its solutions, bringing its total funding to $20M. ■

Its Impact on Procurement and Buying in the NHS?

Nicola Hall, Managing Director at Ingenica Solutions (www.ingenicasolutions.com), the company behind the first GS1 certified inventory management solution in the UK healthcare market, discusses Brexit, exploring its potential impact on procurement and buying in the NHS.

As the implications of Brexit continue to surface, and the debate on whether it will prove a positive or negative move for the UK continues in earnest, there is an ever greater focus on what this means across industries. The NHS has formed a key part of discussions from the beginning. Supporters of the leave campaign cited the billions that could be saved and reallocated to spend on the NHS. This claim has recently come under fire as it is suggested that those who headed the Vote Leave campaign, and used the pledge to invest £350 million a week back into the NHS if the UK were to leave EU, misled voters with their unrealistic claims to allocate extra money to the health service. Those in the Remain team totally disagreed with such claims, and indeed the government has since been unable to commit to these pledges made by politicians. So now the "party" is well and truly over, we need to look at where this leaves our NHS.

What is certain is that difficult times lie ahead. All areas of the NHS will be affected in some way from recruitment, and patient treatment, to regulation, research and funding. The UK's vote to leave the EU will have a major impact on procurement and buying in the NHS, particularly as the sector is already subject to intense financial pressure. Although the extent to which this occurs is not yet clear, it will certainly be impacted in some way.

PRICE OF GOODS

The first challenge is exchange rates, the stability of the economy and the impact that this may have on prices for suppliers trying to supply the NHS.

The performance of the economy is uncertain, although a slowdown of some level is inevitable. In the lead up to the referendum, there were predictions of a significant impact. However official figures are not as gloomy as originally forecast, and in the three months after Brexit, the economy grew by 0.5%, which was greater than expected.

The pound dropped significantly, and this of course will have a knock on effect to import costs for manufacturers, making it more expensive. A prime example of this was the dispute between Tesco and Unilever, which tried to increase its prices to compensate for the fall in value. In a healthcare context, the concern here is that an increase in costs could slow the rate of development and see many smaller organisations, which currently have a great deal to offer the NHS, cease trading. Consider for instance, many SMEs are key to innovation in terms of medical devices and equipment, a reduction here could affect future progress.

Already a number of trusts have issued zero tolerance on price rises. It is evitable that this will impact the smaller suppliers and distributors significantly, and will lead to a number of the smaller companies going out of business, or being bought out by larger suppliers. Hence small businesses are very concerned about their future, and may struggle to survive when faced with increased costs that they are unable to pass onto their customers.

The NHS is encouraged to engage with the SME community; the government has realised that job and wealth creation is fuelled by SME growth. The ripple effect of an adverse current position ultimately means a loss of jobs.

Of course the larger suppliers have greater capacity to absorb such currency issues and costs. The danger for the NHS here is a dominance of large businesses as suppliers, and ultimately a lack of competition that may itself drive up costs. We already know that the government's push to support SME is because that is where they see the most growth for the economy. SMEs are definitely vulnerable amidst such change, and such measures to boost investment and productivity are necessary to avoid a long term slump.

As the pound continues to drop following Brexit, prices will of course rise. Healthcare and the NHS accounts for the second largest spend area for Government, reaching £116.4 billion in 2015/16. As the NHS makes large purchases of supplies from across the world, this will significantly increase costs for an already financially-stricken health service.

Ultimately consideration must be given to what this all means for the patient? Does it decrease the level of care provided. Will it leave patients without treatment, or increase waiting times for those treatments? NHS England chief executive, Simon Stevens stated that leaving the EU could potentially damage the provision of healthcare; so this is an area that needs careful consideration.

GOVERNANCE

Governance is the second issue. The current CE marking is a European wide regulation that allows suppliers to market their products in healthcare. To compete in the EU organisations still have to comply with this standard, but will the UK adopt the same standards for the UK market and its supplier, or alternatively will this lead to a move to independent standards for the UK?

This then raises the question of whether safety is compromised, and again, what this will mean for patient safety, and the costs to the supplier of multiple product certification FDA, CE and UK?

> ...now is the time to fully understand the implications for NHS procurement and buying. Brexit may be the biggest challenge the NHS has faced.

PROCUREMENT STANDARDS

Perhaps the biggest area for consideration as the country prepares for Brexit is that of the OJEU (Official Journal of the European Union) procurement standards. The OJEU is the publication in which all tenders from the public sector, which are valued above a certain financial threshold according to EU legislation, must be published.

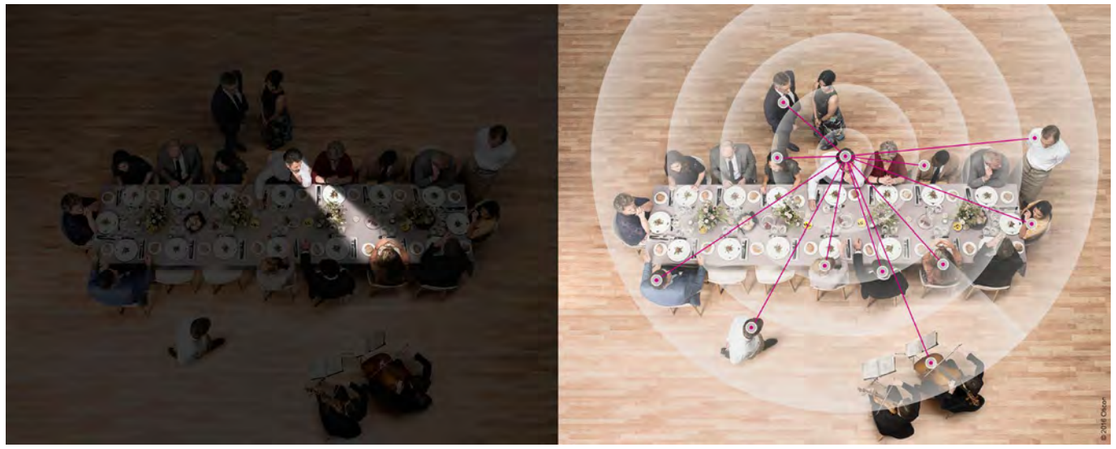
The procurement process for the NHS, and other public sector procurement, is dominated by the rules involved in this standard; the NHS has to abide by EU procurement rules. So is this a chance to review whether post-Brexit use of this procurement framework should continue?

A change in this regulation would mean that UK suppliers could be given a preference over suppliers that are owned or managed off shore. Importantly the legal framework could be changed to allow any trust to buy off any contract that another trust has contracted with a supplier for. This means rather than a trust-by-trust contract, each supplier would effectively have an NHS contract. Each Trust or hub could then advertise that contract to the rest of the NHS; and the other trusts could offer a fee for using the contract. By osmosis national pricing will occur and the procurement departments that are better at contracting will end up with not only the best contracts, but bigger departments that are better funded, ensuring that they invest in the development of their teams to increase the procurement expertise across the UK.

This change in the legal framework would ultimately create the outcome of standardised pricing across the NHS, centres of procurement excellence, and pricing comparison that the government is trying to achieve through the current procurement strategy. The GS1 initiative supports this approach, and would work through the drivers that we see active in the NHS, being a natural competiveness and ambition to be the best.

IN A REFORMED EUROPE

Given the ongoing operational and financial challenges in the NHS, its future remains uncertain, and in light of Brexit the consequences could be even greater. Following Theresa May's announcement that Brexit negotiations will begin in March 2017, it is thought that the UK will be officially out of the EU in 2019; and whilst it is of course difficult to forecast the level of impact, now is the time to fully understand the implications for NHS procurement and buying. Brexit may be the biggest challenge the NHS has faced. ■



An Internet of Things that Matter

We're living in a world of smart, connected devices. According to reports, there are currently around 25 billion of these connected devices on the planet, and this number will double by 2020. That's about eight smart devices for each person on earth. But do we really need to be able to switch on a coffee machine from the bedroom, or turn the lights off from the comfort of a chair?

Jens Rosenstand, Head of Product Management at Oticon, was involved in the development of Oticon Opn, the world's first internet connected hearing aid. He talks about how the potential of smart devices to help improve our lives can reach further than simple convenience. The goal is to create an 'Internet of Things that matter'.

How do you view the rise of IoT so far?

Certainly from a smart devices perspective it has boomed. What we're seeing develop at the moment is better ways to use these devices, and applications that go beyond convenience to make a genuine difference to people's lives. This is obviously our modus operandi at Oticon – we're in the business of changing lives, and helping people with hearing loss to overcome day to day difficulties. The Internet of Things and smart devices was central to this with the launch of Opn – that and our choice of platform. While we believe the design, comfort and sheer processing power of Opn to be truly revolutionary, from a connected devices perspective it's really the application of If This Then That (IFTTT) that unlocks the potential.

Currently IFTTT includes over 350 channels or 'smart products' and this number is rising all the time. The great thing about IFTTT is that it's a community-based platform, so people can constantly add ideas for recipes or actual recipes they've used to help drive creativity and add functionality that others may not have considered. Opn is the first hearing device compatible with the service, and when we start imagining the various ways these devices can be connected and work together to enhance our lives, the possibilities are endless.

What does Opn and IFTTT bring to the table from a connected devices perspective?

Being the first hearing device to be compatible with IFTTT represents a quantum leap forward for hearing devices and smart devices working together. The fact that we can interact with so many third party devices – coffee machines, doorbells, baby monitors – all that kind of stuff, that's really cool because nobody has ever done this before, and it's a market that is growing every single day.

So instead of us having predefined fixed devices that you can use, we simply open up to whatever you want to connect to. We don't define what is possible; all the companies that join the IFTTT system define that. We are part of a huge ecosystem, and working through IFTTT, our possibilities are expanded the very second new connected devices become available.

The important thing to know here is that devices and services people depend on for their health and safety can join today's more entertainment and convenience-oriented offerings. For example, children with a hearing loss depend on their hearing aid – a dead battery is much more than an inconvenience. An IoT hearing aid can address this issue by sending a text message to a parent when the battery is running low, or a mother with hearing loss can benefit with an alert to her hearing aid from the baby monitor when her baby is crying.

What are some other examples of the use of smart devices for the hearing impaired?

The list of channels and devices currently present on IFTTT is huge. You could create a recipe to alert you via a hearing aid with a customised text to speech alert when someone rings the door bell. For the hearing impaired this means they can move about their home without worrying that they'll miss a visitor, and for the visitor it could help to avoid anything from mild inconvenience to genuine concern.

You could create links to smart medical devices to remind you to take medicine or a blood pressure reading, or to remind you of an appointment with a doctor or carer. Consider something that an elderly person does every day – perhaps turn on the coffee machine or switch on their hearing aid or the bathroom light. With connected smart devices a notification can be sent via SMS or email to a carer when this action is taken, and in turn a message can be played to let the individual know – "we've let Susan know you're ok". There are even smart pillboxes now that you can configure to send a similar message, but this time to notify that medicine has been taken, and perhaps in this instance it would be also sent to a medical practitioner.

You can also configure recipes to work based on geo-location too, for example, send an SMS or message to let someone know you've made it back home ok. For people with hearing loss who have young children this function could be combined with a GPS tracker, perhaps placed in a schoolbag, to let them know the child has made it to school ok, or made it back home.

Or consider a security camera in the home – if these cameras detect movement, they might typically send you an email or perhaps an SMS. Here you could have it immediately alert you through the hearing aid, allowing you to log in to your security camera feed to see what's going on and react accordingly. The same goes for a smoke detector, water leakage detectors – all kinds of alert systems that you can buy today.

We don't in any way limit what people can do, we just offer access to the system to allow them to go in and create all kinds of recipes in an extremely easy way – no programming, no technical knowledge required.

How easy is all of this to do?

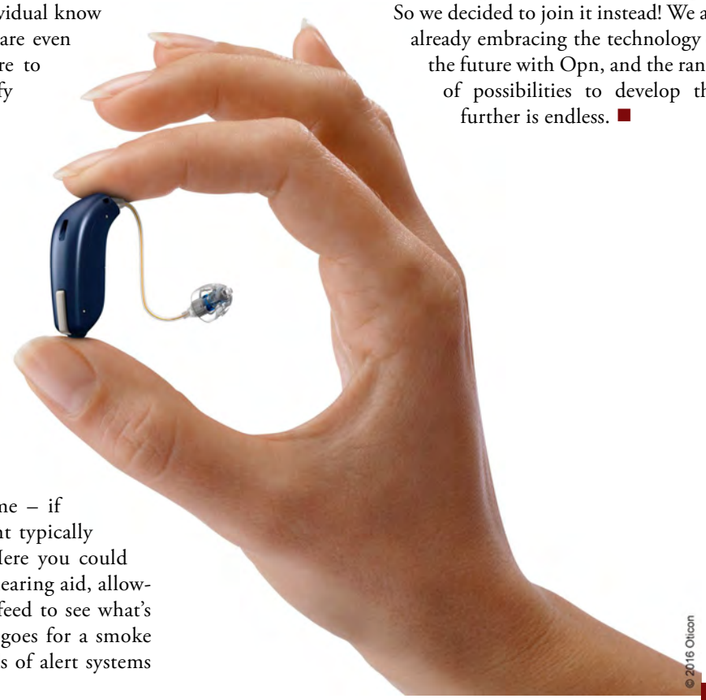
A very interesting question I've been asked is 'what about elderly people who do not have the skills to set this up, can they still benefit?' The answer is yes, they can really benefit. Setting up recipes is really, really easy using IFTTT. With a bit of practice and perhaps a bit of help to begin with it's straightforward to build a recipe and then tweak and change it as you see fit.

But let us imagine an elderly person who has no access or inclination to set up recipes on IFTTT. A friend or relative could set up a recipe for the benefit of both people. For example let's say you create a recipe for your elderly mother that informs you if the batteries on her hearing aid are getting low. You could then phone her up and let her know they need to be changed, or pay a visit to do it for her. So it could also be used to assist elderly people who are not that confident with technology.

What does the future hold?

There's no doubt that connecting devices to the internet is the future, and it's happened right now. You can see it with all kinds of crazy devices. I just heard a couple of weeks ago that a tyre company are going to build in small, low-energy chips into tyres, which connect to the car, and via the car they will be able to trigger alarms if the tyre pressure gets low or the tyre gets worn, or the wrong types of tyres are being used on the wrong surface – all of this information from a tyre.

We are just at this start of this amazing journey – it's exploding around us right now, and we can't stop it. So we decided to join it instead! We are already embracing the technology of the future with Opn, and the range of possibilities to develop this further is endless. ■



Perspective on the Digital Transformation of Healthcare

By Keith Nurcombe

Keith Nurcombe has worked in healthcare for over twenty years spending the last few years working with businesses in the health and technology space, most recently building O2 Health where he was Managing Director until the end of 2012, since then he has been providing consultancy services to businesses.

For me this is where healthcare gets very interesting, when we take the classroom theory to the hospital, or the patient, in order to really deliver a meaningful experience for them.

We spend so much time on mhealth or digital healthcare talking about what we can do and trying to justify why it is okay to do this digitally, and differently, that sometimes we get too far into the woods to see the trees and more importantly the way out.

What is really interesting? And, what is defining the practical change going on out there into reality for patients and clinicians?

This is the really fun part – what's making a difference? – A well worked phrase but a good one for these examples:

Changing in the 50 year old primary care model in the UK – being able to book appointments online, get your repeat medications online and most importantly being able to reliably and safely get medical advice 24/7, which means you may not have to see the GP at all. Doctorlink is a product starting to do this in the UK. Patients no longer having to go into surgery and wait for their GP – but instead can access services when and where they need it. This in turn enables clinicians to spend time with the patients they really need to.

Patients with long term conditions being able to send in their information to their clinician, have that information reviewed quickly and efficiently so that the clinician, using video-calling, can talk to those patients that they need to while remaining confident that their other patients are all within the parameters that the clinician is comfortable with. This is not new but we have spent a long time dismissing this kind of digital transformative healthcare process and we shouldn't because it works – WSD in the UK, Veterans Association in the USA, etc.

Diabetic patients being able to monitor there blood sugar from their sweat through a wearable device and transfer that information to their clinician rather than traditional blood tests at home or their local surgery and then waiting for the results. Similarly, the fact that clinicians are now able to adapt patient's dosage directly through connected devices!

Patients being able to have their atrial fibrillation monitored from a device the size of a 50p piece in their pocket and that information being instantly received and used for accurate diagnosis anywhere in the world. From there their treatment can be managed completely remotely and digitally.

This is happening now!

This is what joined up digital healthcare, making a difference is all about. We talk about it, but this is actually living the dream and doing it for real. Saving clinicians time, delivering a better service to the patients and to the wider healthcare system!

Let's do more, let's get out of the labs, let's stop doing small scale trials and just get big and bold and change the world… Not sure I am the first to say that but think it is really relevant for this article! ■

President Trump and the Coming Health IT Revival

As the Trump Administration prepares to assume power, C-level healthcare executives are assessing the likely implications for their organizations and reexamining their goals and strategies.

There is consensus among the hospital CEOs, CMOs and CIOs I've spoken with since the election that Obamacare will change, but of course no one at this point can say how much or how fast. Candidate Trump spoke of the need to repeal and replace the ACA, while President-elect Trump's positions have seemed more nuanced. The nomination of Rep. Tom Price – a tireless critic of Obamacare – for Secretary of Health and Human Services, and Seema Verma to head CMS, provides us with a compass for where we are likely to be headed.

Whatever the reality turns out to be, we can safely assume we will see a general trend away from government mandates, and as such, one area where we will notice a major difference – and one that hasn't received as much press attention as some – will be with regard to the EHR and its current role in the hospital IT shop.

In its desire to measure healthcare in order to manage it more effectively, the ACA has, over time, instituted incentives and requirements around the EHR because – to paraphrase Willie Sutton – that's where the data is. But imposing these requirements has had the unintended consequence of diverting IT resources to, essentially, EHR management: complying with meaningful use and other EHR-related regulations, reporting on that data, identifying trends and so on. Regulation, compliance review, development, analysis, reporting – and repeat, endlessly. Talk to any healthcare executive, physician or nurse about operational challenges and he or she won't take long to mutter something uncomplimentary about the EHR as a resource-drain so profound it exerts a kind of gravitational force, like a black hole, warping the space around it to the detriment of other potentially innovative IT initiatives, preventing those from achieving launch velocity.

None of which is to suggest that EHRs are inherently bad; they're not, and in the long run they will almost certainly prove their usefulness. But so far, they have not contributed to a culture of innovation. And I am not suggesting that mandates and federal regulations are going away; there will still be plenty to comply with. But under Trumpcare (as we imagine it might be), CIOs will have more leeway and resources to implement innovative ways of achieving desired results such as higher quality, lower cost, greater efficiency, and more satisfied providers and patients. With the EHR-centric focus pared down – preserving the EHR's useful functions while surgically removing the excesses – IT departments will find themselves with a role to play that is less reactive and mechanical and more forward-looking and strategic. It's a world, frankly, that could give hospital executives, physicians and the patient population they serve a reason to be cheerful.

IT will improve care team effectiveness, patient outcomes and organizational performance. Our industry is moving towards what the Gartner research consultancy has termed a real-time

health system, in which sophisticated clinical communication and collaboration systems enhance care quality, care coordination and the patient experience. Expect implementation and utilization of these systems to accelerate, and to complement the EHR once IT is freed to explore innovative technology outside the EHR.

IT will finish connecting the care continuum. The promise of seamless connectivity among acute care teams, external caregivers and patients and their families sometimes exceeds the reality. Users demand enhancements and require support – which IT has often been unable to address due to mandated priorities. Trumpcare will certainly maintain the goal of keeping people out of hospital – for example, the 2016 Republican Party Platform explicitly states, "Because most seniors desire to age at home, we will make homecare a priority in public policy." Dependable, HIPAA-compliant communication and collaboration capabilities that work will proliferate, to the benefit of all.

IT will help realize the promise of value. The volume-to-value transformation is well underway and there is no going back. No one – payers, providers, health systems or patients themselves – can afford or has an interest in returning to an exclusively fee-for-service model. What this means for healthcare in general, and IT in particular, is there will be accelerated demand to create operational and workflow efficiencies, prevent unnecessary readmissions and find ways for patients to participate to become more invested in and responsible for their own care.

Cost remains the driver. IT will help contain it. No surprises here: Private payers will attempt to control cost while maintaining quality. Insurance companies will pressure hospitals to reduce cost. Hospitals will feel pressure to drive down cost. How will this happen without lowering quality or reducing accessibility? One answer is for healthcare systems to begin to realize the same efficiencies and productivity gains as other industrial sectors have – through digitalization, automation and increasingly intelligent and innovative IT systems.

IT will give consumers the choice and control they demand.

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A recent McKinsey & Company study proclaimed that "tech-enabled consumers are reordering the healthcare landscape." Assuming Trumpcare calls for wider use of HSAs to provide more consumer choice and control, that opens up the opportunity for a host of applications to enter the market to meet accelerated consumer demand, similar to what we have seen in retail, transportation and other sectors over the past decade. IT will step up with simple yet robust mobile solutions that, for example, allow healthcare consumers to evaluate which hospital system's costs, expertise and success rates provide the best value for any given consumer's needs.

So as the nation at large and the healthcare industry in particular holds its collective breath and grapples with the implications of the election, executives in a position to develop and bring to market innovative healthcare technology strategies needn't sit on the sidelines. We can get to work – confidently, and, yes, optimistically – right now.

Stuart Hochron, MD, JD, is the co-founder and Chief Medical Officer of Uniphy Health. ■

Transforming Asthma Care through Digital Health

By Joseph Clift

Within asthma care we see an exemplar of both the brilliance and the imperfections of technology. The mass availability of convenient, affordable, effective asthma inhalers from the 1970s onwards completely transformed the daily lives of people with asthma. Outcomes improved dramatically as a result, but in recent years we've seen these plateau,[1,2] in part because the design of the inhaler can make it difficult to use correctly.

Asthma is an episodic condition where severity and risk of a potentially life-threatening attack can vary day by day, season by season and across a person's lifetime. Medication needs to be delivered variably to manage an individual's asthma 'pattern'. All treatment regimes are complicated and this is added to through the variety of different inhalers. It is the promise of new mHealth technologies that might finally deliver the personalised lifetime asthma support that people with asthma need.

Uncontrolled asthma has an impact both on the individual and the NHS. In the UK around £1 billion is spent annually on asthma treatments,[3] which are imperfectly used at present. Estimates on non-adherence to medication have suggested as much as 70% of people with asthma do not take their medication as prescribed.[4] Given the financial challenges the NHS faces we urgently need a shift towards supported self-management to keep people well and ease the pressures on overstretched clinical services.

Asthma has one of the best evidence bases for self-management when considered alongside other long-term conditions.[5] In addition, the Royal College of Physicians' National Review of Asthma Deaths identified areas of basic care that need to be tackled.[6] Digital health offers a significant opportunity to address both areas, and in particular help activate self-management at scale.

Asthma UK's Connected asthma report has considered some of the types of technology already emerging – from predictive algorithms that could help identify those most at risk of an asthma attack, to digitally-provided asthma action plans and smart inhalers.[7]

INNOVATING THE INHALER

Smart inhalers, linked to smart devices via Bluetooth, use sensors able to measure when inhalers are taken in real-time. One of the challenges currently in improving adherence is that individuals are likely to overstate this through current data-capture mechanisms,[8] and at an annual asthma review people may forget to mention occasions when their condition worsened during the preceding year. Smart inhalers could provide a level of automation to this data-capture, enabling healthcare professionals to have an objective picture on adherence to better tailor interventions.

Adherence to prescribed medication is vital to achieve, but it is also key to ensure that people are using their inhalers effectively, and we know that up to a third of people with asthma are not using their inhalers in the right way.[9] In the future, smart inhalers may help to improve inhaler technique.

These devices are already starting to be used within the USA, in addition to trials in the UK, and the early results from published clinical studies are encouraging – one trial saw a 60 per cent improvement in asthma control.[10] A number of different devices have been developed in recent years, many of which are developing links with pharmaceuticals, which is why some market analysts are already predicting that the smart inhaler market could reach $3.56bn by 2024.[11]

USER-CENTRED mHEALTH FOR ASTHMA

Asthma UK provides patient engagement as a partner on myAirCoach, a project funded by the European Commission that aims to develop a holistic, personalised asthma monitoring system. The views and needs of people with asthma have driven the development of the system, which included surveys and focus groups seeking to find out what they would value from mHealth, and how willing they would be to use an mHealth system to help manage their asthma. In surveys of people with asthma, around 45 per cent of people with asthma would be willing to change the brand of their inhaler to have access to an mHealth system to manage their asthma; but only 20 per cent of iPhone users and 32 per cent of Android users would be willing to change their operating system to have access.[12]

When compared with healthcare professionals managing asthma patients, both groups valued measurements and alerts related to lung function, breathing pattern and cough, and environmental measurements as being helpful to maintain asthma control by both end-users.[13] However, their views did not always align, as healthcare professionals showed significantly more support for measurements of medication adherence and inhaler technique than people with asthma.[14]

These initial insights from myAirCoach suggest the design of mHealth products measuring these needs to be carefully considered to ensure the products are used effectively as self-management tools. Technology that requires big changes in everyday usage and habit, delivers a poor user experience, or requires anything other than limited data input is unlikely to be used over a lifetime – as has been demonstrated in systematic reviews of asthma apps.[15,16] User-centred design is paramount to ensure large scale sustained adoption of mHealth for asthma.

KICK-STARTING TECH-ENABLED ASTHMA MANAGEMENT IN THE UK

Technology offers much promise but we are still at the early stages. More needs to be done to help ensure that people with asthma in the UK are able to benefit from a new connected way managing asthma.

1. Existing technology needs to be introduced today to improve asthma care. If you have an action plan, you are four times less likely to be admitted to hospital, but only 30 per cent of people with asthma have one, with nearly all provided in paper format. Only one GP software provider currently offers a digital personal asthma action plan – all providers should seek ways to ensure these are made available to people with asthma.
2. New technologies need to be designed with the asthma user in mind. Asthma needs more research, and greater investment is needed to develop innovative technology that can connect across all NHS systems and is aimed at helping people self-manage their asthma.
3. The NHS should develop a testing programme for smart inhalers in the UK. These innovations show great promise to make better use of NHS resources, and improve patient care, but need to be introduced within the NHS carefully to ensure their success.

ABOUT ASTHMA UK

Asthma UK is the UK's leading asthma charity. It works to stop asthma attacks and, ultimately, cure asthma by funding world leading research and scientists, campaigning for change and supporting people with asthma to reduce their risk of a potentially life threatening asthma attack.

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Improving the Care and Prevention of Falls for People with Dementia

Author: Dr. Emma Stanmore - Senior lecturer, School of Nursing, Midwifery and Social Work and MAHSC (Manchester Academic Health Science Centre), University of Manchester, emma.stanmore@manchester.ac.uk

Abstract:

Falls are a common health concern and a leading cause of accidental death in older people worldwide. Over 30% of people aged 65 and over and 50% of people aged 80 and over fall at least once a year. On a more positive note, robust evidence has demonstrated that specific strength and balance exercises are effective in reducing falls. However, there is a dearth of research that has specifically investigated falls prevention exercise interventions for people with dementia.

To tackle this issue, we applied gamification theory and user-centred design to develop MIRA Exergames (physical exercises incorporated into video games) specifically for older people to train lower limb strength and balance. We have commenced a study that included a person with dementia, Laura, whose case study we present below.

Laura is in her 80s and had recently moved to a new flat in a sheltered housing facility.. Her primary interest and that of her family was to help her socially bond with other residents. She started the Exergames facilitated by a Rehabilitation Assistant together with the other residents. Laura needed a lot of hands on support at first to correctly get the technique required for the exercises, but after a few weeks she was following most of the programme without promptings. It was noted by Laura's family that she appeared to improve both physically as well as in mood and confidence, and even though Laura was not usually interested in technology or exercise, she enjoyed playing the Exergames.

Discussion

Falls are a leading cause of accidental death in older people and as the population ages, falls and associated injuries are likely to increase. An estimated 424,000 fatal falls occur each year, making it worldwide the second leading cause of unintentional injury death, after road traffic injuries (WHO, 2016). Over 30% of people aged 65 and over and 50% of people aged 80 and over fall at least once a year (Blake et al.,1988; Gillespie et al., 2012). The direct and indirect costs of falls are substantial, in the UK costs are estimated at more than £2.3 billion per year (NICE, 2013) and in the US, treatment for falls was estimated at over $31 billion in 2015 (Burn et al., 2016).

Several medical conditions are related to a higher risk of falls, such as Stroke, Parkinson's, diabetes, cardiac arrhythmias or cognitive impairment (WHO, 2007). In particular, people with dementia have 8 times more risk of a fall than those without the disease (Muir et al., 2012; Allan et al.,2009) due to problems with postural instability, impaired gait, medications, and

vision impairment (Shaw, 2007).

Robust evidence has demonstrated that specific strength and balance exercises are effective in reducing falls in the community (Gillespie et al., 2012). But there is a dearth of research that has specifically investigated falls prevention exercise interventions for people with dementia. A recent systematic review and meta-analysis (Burton et al., 2015) found that exercise programmes may potentially assist in preventing falls in people with dementia but more research is needed. It is known that older people in general have low levels of physical activity and there is low uptake and adherence to recommended falls prevention exercises without support from therapists (Lord et al., 2003), however levels of exercise adherence in people with dementia has not yet been explored.

New approaches – using MIRA Exergames technology to engage older people in exercising

To tackle this issue, we applied gamification theory and user-centred design to the development of Exergames (physical exercises incorporated into video games for use rehabilitation using natural interaction sensors, such as the Microsoft Kinect) specifically for older people. Feedback from older users and therapists was incorporated into the design of the Exergames and continual feedback was given so that improvements could be made. Technology with remote sensors enable real time, reproducible and reliable movement pattern analysis. With the advent of gamified rehabilitation programmes, benefits may be seen through increased motivation and entertainment (Lange et al., 2009) which may lead to improved adherence to rehabilitation programmes. They are also inexpensive, can be safely used in the home and can interact with the user to ensure that correct movements and adjustments are made.

We have commenced a study that uses MIRA as a gamified falls prevention intervention, in several sheltered housing facilities in the UK. MIRA is a software platform containing Exergames developed based on best evidence for older people, which also gathers statistics data regarding movement performance and

treatment adherence during the sessions, allowing clinicians to create personalised treatment plans adjusted to the needs of each individual. Although the primary aim of the study is to improve balance and motor function in older people, a person with dementia (moderate stage) asked to use the Exergames and we present this person's case below.

Laura's case – learning to use MIRA Exergames

Laura is in her 80s and according to her daughters', was diagnosed with Vascular Dementia two years ago.

"Laura took part in the Exergames research at a time when she was making the transition from her daughter's home into a flat in a sheltered housing facility. The scheme manager at the Sheltered Housing facility approached me and asked if Laura could take part as she thought it would be a good way for her to get to know the other residents", explains Margaret Clarke, Rehabilitation Assistant.

Being part of the Exergame programme appeared to help Laura settle into her new flat and the sheltered housing facility. It also gave her the opportunity to meet the other residents three times a week for 12 weeks, which appeared to help her socially bond with other residents. Laura's daughters were surprised that their Mum was taking part in the trial, as they say she wasn't really one for exercises.

"It was challenging for both of us getting to know the Exergame software and the different games. She needed a lot of hands on support at first to get the technique correct, so we took it slowly. This allowed her to feel the movements as she was unable to retain the information from the quick tutorial at the start of each exercise. It was the repetition of movement and verbal instruction that worked best. After 12 weeks, Laura could follow most of the Exergame programme without prompt. She even mastered the techniques for the knee flexion exercise, which appeared to be the most trickiest to learn for most people. Laura appeared to fully enjoy the Exergames, was always eager to take part and would be always waiting for me to arrive and start playing. I feel the Exergames really helped Laura's confidence and with the interim period of moving into a new home and unfamiliar surroundings."

The Rehabilitation Assistant's perspective

The first concern I had in regards to using technology was about its usability, and when we started the study we had a lot of sceptical looks from participants, therapists and outsiders: how would older people get along with this?

Margaret shared her experience: "I started using the MIRA Exergames in April this year (2016). I have lots of experience of teaching exercises on a one-to-one basis and in a group setting, but I didn't have very much computer technology experience. So although I had some training in the use of the Exergames, it was basically on the job training that was needed. I don't usually use computer games leisurely. I usually work as a Rehabilitation Assistant within a Falls Prevention Team of Nurses, Physiotherapist and Occupational therapist but mainly assist the physiotherapists teaching Otago home exercise programmes to patients' at risk of or prone to falling. As I got to know the Exer-

games and how MIRA worked I became much more confident."

Margaret explains that MIRA Exergames could be used for people with dementia, due to the fact that the Exergames can be adjusted to the level of difficulty that matches each person individually and that people enjoy playing the games and forget that they are exercising: "I have taught quite a few patients in my usual job as a Rehabilitation assistant who struggle with Dementias. Small sessions are best and lots of repetition. Teaching the person on a one-to-one basis and tailoring the programme for the person is usually the best method. Treating the person with respect and dignity is of course important and we have found the fact that the Exergame sessions are fun and friendly is very important."

The potential of MIRA Exergames

There were lots of positive stories reported by participants in the study. In Laura's case, she learned to use the Exergames independently by the end of the 12 week trial, even though she has vascular dementia, and she enjoyed taking part.

"We also had a lady with depression and affected by Alzheimer's disease. At first she needed to use the support of two chairs, one at each side when practicing the general shoulder exercise and also lots of hands on support from me. By the end of the 12 weeks she could practice this exercise without chair support and instruction." (Margaret, Rehabilitation Assistant)

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Realising the Promise of Clinical Decision Support

By Dr. Darryl W. Roberts and Dr. David Friedenberg, Battelle

Will all of tomorrow's healthcare decisions be made by computers? Not quite, but Clinical Decision Support (CDS) tools can make doctors, nurses and other healthcare workers smarter and more effective. Thanks to advances in data analytics, this machine-assisted medical future is closer than you may think.

Beyond the Pop-Up Alert

Technology-enabled healthcare decision making is not new. Alarms on ventilators and IVs, pop-up drug interaction alerts and other basic decision support tools have been in use for decades. However, these simple alerts and alarms do not rise to the level of CDS.

The Office of the National Coordinator for Health Information Technology (ONC; HealthIT.gov) defines CDS as a system that "provides clinicians, staff, patients or other individuals with knowledge and person-specific information, intelligently filtered or presented at appropriate times, to enhance health and health care." In other words, it is the ability to get the right information to the right people at the right time in order to inform diagnosis, treatment or follow-up. CDS uses data from a variety of sources (e.g. medical sensors, electronic health records (EHRs), physicians' and nurses' observations and clinical knowledge bases) to provide real-time guidance to clinicians using established and vetted guidelines. Many examples are already in use today:

» An obstetrician inputs data and observations into a computerised decision tool to predict the viability of a fetus and make informed decisions in a high-risk pregnancy.
» A pacemaker uses wireless technology and a mHealth app to provide real-time alerts, as well as analysis of stress conditions leading to spikes, to inform patient care.

CDS has the potential to improve patient outcomes and healthcare efficiencies significantly. CDS tools can help doctors and nurses avoid errors and adverse events and increase quality of care while reducing overall costs. That's why the Centers for Medicare and Medicaid Services (CMS) gave CDS an important role in the original Medicare and Medicaid EHR incentive program. That worked so well that under the Medicare Access and CHIP Reauthorization Act (MACRA) Final Rule, CMS does not require CDS reporting, because it has "topped out" or achieved its goal. This change suggests that hospitals and healthcare providers will increasingly rely on CDS tools to help them meet both patient care and financial goals under CMS' Alternative Payment Models (APMs) and similar models preferred by private insurers.

The Smart, Connected Future of Clinical Decision Support

While healthcare providers already rely on a multitude of tools to support decision making, we have only begun to scratch the surface of what will soon be possible with CDS. Imagine:

» A hospital physician faced with a patient presenting unusual symptoms inputs data and observations into a system that combs through millions of health records across the country to identify a handful of similar cases in other regional hospitals, suggesting the emergence of a new infectious disease.
» A rural primary care physician accesses an expert knowledge base and decision support tools to properly diagnose and make effective treatment decisions for a patient with a rare genetic disorder who is unable to easily travel to a specialty hospital for treatment.
» An epidemiologist tracks the spread of flu in real-time using data mined from millions of EHRs or personal health records (PHRs).
» A pharmaceutical company mines data from patients receiving a recently approved cancer therapy to monitor for rare adverse effects that may not show up in clinical trials and identify variables in dosage, timing, drug co-administration, patient characteristics, lifestyle and cancer type that impact treatment efficacy.

These examples are already within reach using the technology we have today, thanks to advances in health IT and data analytics. EHRs improve accessibility to patient data, but limitations to usability and interoperability still present challenges. In its current state, EHRs accessible to clinicians, patients, and (with appropriate HIPAA protections) researchers make it possible to employ advances in "big data" analytics tools that can put that data to work. Instead of simply making recommendations for individual patients based on standardized guidelines, we can now use data mining, text mining and machine learning methods to extract subtle patterns in massive data sets and create new recommendations informed by cumulative expert knowledge and statistical analysis.

Sophisticated analytical programs are able to collect and analyze data from disparate sources—for example, body-worn medical sensors, EHRs, PHRs, administrative and billing records, imaging and diagnostic data and more—in order to answer complex medical questions. Using these methods, hospitals and care providers will be able to make treatment decisions matched to patient and disease characteristics, quantify the added value of a treatment, or even automate some aspects of patient care. Other programs enable providers to mine large knowledge bases (such as PubMed) to inform evidence-based practice and identify hidden connections. For example, Battelle Sematrix™ uses natural language processing to sort through large corpora of unstructured scientific or technical information, allowing users to answer complex questions. Unlike simple keyword queries, these programs are able to make inferences by combining knowledge contained in different documents within the corpus.

Removing the Barriers to CDS Implementation

While basic technologies for CDS are already in place (and according to CMS "topped out" in their use), that doesn't mean the industry is maximizing their utility just yet. Before that can happen, the industry needs to resolve significant market, technical and human constraints.

One of the most significant technical constraints is EHR interoperability. Each of the commercially available EHR systems tags and stores data differently. This severely limits our ability to combine records from different hospital systems for large-scale data mining. Interoperability minimises the differentiators among EHR companies and even healthcare systems. There are currently not enough incentives in place to make data interoperability a priority for them in the current market. In fact, there are disincentives, even in the presence of government-sourced incentive programs. This means that researchers and clinicians who depend on easy exchange of health information for improved care coordination, reduced costs of care, and research to enhance practice are forced to use existing, inefficient workarounds. These workarounds include using traditional resources, including questionnaires, that obtain needed information at the cost of additional clinician burden.

Another significant factor for the acceptance of CDS is usability. Decision support tools must fit within the clinical and administrative workflows and must be easy to use and understand in a complex, fast-paced environment. This is especially true of decision support built into "RN-ware" [1] or devices used by nurses to make on-the-fly patient care decisions. Already, nurses working in an ER or ICU may have dozens or even hundreds of devices that they use over the course of their day, each with its own unique alert sounds and interface. The resulting confusion makes medical errors more likely as nurses may miss critical alerts buried in the noise or misinterpret recommendations due to data overload. As more of these devices begin to incorporate sophisticated decision support tools, developers need to incorporate human factors to ensure that the systems help clinicians manage the volumes of data they are presented with and enable them draw fast, effective conclusions.

CDS and the Evolution of Medical Care

Clinical decision support is not about supplanting human thought. In an ideal world, CDS frees up doctors, nurses, caregivers and patients themselves to access wider knowledge bases and datasets and to think more deeply about what the collected data and knowledge is telling them. CDS tools are already making healthcare providers more effective and efficient and improving the quality of care for patients.

The data revolution in healthcare is moving fast. According to the MACRA Final Rule, CMS expects 80 to 90 percent of eligible clinicians to participate in APMs and other value-based payment models by 2020, thus shifting away from the current method of payment for quantity. This will result in a similar pay-

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ment model shift by private insurers, as well as increased competitive pressure for improved quality of care. This will serve to push health care systems towards wider adoption of data-driven decision making. Data analytics and CDS tools will be critical components in helping the industry meet CMS targets and improve patient outcomes and financial returns. We can expect to see increasingly sophisticated CDS tools baked into tomorrow's smart medical devices and programs.

Most of the components necessary to achieve the full promise of CDS already exist in some form. To bring the vision to fruition, medical device manufacturers, EHR and other software developers, health care systems, clinicians and patients will need to work together to solve issues around interoperability, data accessibility and human factors. As we make data more accessible, usable and understandable, CDS and data analytics are poised to take healthcare to a whole new level.

Dr. Roberts coined the term "RN-ware" in a 2015 MS Health Blog to explain how nurses pull together knowledge from a multiplex of disparate information sources (e.g., EHR, IV pump, ventilator) to draw the clinical picture of a patient for herself and other clinicians—oftentimes in an instant.

About the Authors

Dr. Darryl W. Roberts is a Registered Nurse and a Healthcare Quality Research Leader at Battelle. He has more than 25 years of experience in patient care, informatics, management, research and education. His recent work includes developing economic metrics for public health interventions, supporting the quality Measures Management System for CMS, developing quality measures for SAMHSA and bending qualitative research methodologies to make their use possible in natural language processing and big data analytics.

Dr. David Friedenberg is an Applied Statistician and Data Scientist whose work focuses on extracting meaningful information and structures from large, high-dimensional datasets. At Battelle, he analyses complex high-dimensional data in fields such as Neuroscience, Chemical Forensics, Medical Devices and Astronomy as well as large health care and insurance databases. ■

Breaking Boundaries in Digital Health

As a leading provider of digital patient engagement and data capture solutions for clinical trial and digital health programmes, Exco InTouch has pioneered the use of mobile and digital technologies as research and engagement tools for the pharmaceutical industry.

We spoke to CEO and founder Tim Davis to find out more about the way in which Exco InTouch has leveraged advances in technology to continually break boundaries and drive new concepts in the clinical trial process and digital health programmes.

The company recently introduced a revolutionary new product suite, Gather™, which makes taking part in clinical trials much simpler and more engaging for everyone involved. Beyond clinical trials, the organisation has developed a world leading digital health platform, which uses a combination of mobile apps, web portals and connected medical and lifestyle devices to help patients better understand and manage their conditions, whilst providing tools to enable healthcare professionals to remotely monitor each patient.

Davis founded Exco InTouch in 2004 with the initial aim of utilising mobile text messages to improve a patient's journey through clinical trials – communicating with patients and reminding them of medication regimens, treatment instructions and site visits.

"My last role before starting Exco InTouch, was working for a company where we were doing, at the time, Palm Pilot based e-diaries, which was a huge step forward from paper diaries, but obviously had some unique challenges with them as well." describes Davis.

"This was new technology that not many people understood or had access to. There were therefore limits to its applicability to patients and also limitations to how the technology could be deployed."

"I was looking for a more simplistic way of engaging, and improving the conversation, with patients, using technology that was more familiar to them. That was why, when we started the business 12 years ago, it was really around text messaging. It was a very light-touch way of engaging with patients in clinical programmes."

"When we first started out sending text messages, we realised pretty soon that just telling someone the same thing every day gets old quickly. It's about trying to maintain a theme of a message, but making it relevant, so that it almost doesn't remind them, but instead provides information about their disease or condition which will then naturally lead them to remember to take the medication or whatever we want them to do at that particular time."

"It's about pushing information back as well as pulling information from the patient, making it a two way conversation, and ensuring that they have access to the information themselves. I think all the things that clinical trials were guilty of, certainly in my time, was that we just saw patients, almost, as guinea pigs where we just expected them to fulfil this obligation as a data source."

"What we needed to be doing was ensuring that people know where they are in their treatment process and how are they doing? Are they heading in the right direction? Do they need more help? Do they need support in particular areas? By having access to the data, we should be able to manage all of these kinds of things… There is a huge amount you can do with technology, but it's important not to forget the patient at the centre of all of it."

With the ubiquitous growth of mobile phone ownership and new options for engaging patients using advances in technology Exco InTouch has worked with many major pharmaceutical clients to tailor their approach to clinical trial data capture and patient engagement.

"One of the early things we did was to work with Pfizer, to try and generate a clinical trial that had no physical assessments, so there were no clinical site visits." explains Davis. "The idea was that the patients could be recruited over the internet. They would then receive medication, along with an electronic diary, installed on a mobile phone in the post, and a DVD with all the instructions on. They would then complete that and use Skype video links to have remote assessments with a virtual physician."

"That was certainly one programme that tried out a lot of technologies for the first time, and it did work. We were able to get patients to complete questionnaires on a device without actually having someone sit next to them and train them as to how it works."

Providing this combination of data capture, patient engagement and disease management has placed Exco InTouch in an enviable position, where the company is able to work with its long-standing pharmaceutical customers to develop tailored programmes that encompass many of the digital ambitions of the industry.

"I think all of our experience in clinical trials meant that we could do a lot more in health management." continues Davis. "We knew that we ticked the box with regards to regulatory compliance, patient confidentiality and all of those kinds of things. By applying our gold standard security from clinical trials into broader health management services, we have been able to do a number of interesting programmes."

These projects have included the 'Me and My COPD' programme with AstraZeneca, and more recently the 'Target My Hives' programme. The focus for this has been the creation of communities that promote disease awareness and connect patients, physicians and patient advisory groups in order to facilitate the conversation around a particular condition and the potential treatments.

"There are programmes we are running that are linked to a particular medication and there is real merit in doing that because, often, there are certain factors, or certain features, of a particular medication or perhaps how you take that medication, perhaps if it's in a medical device, how you use that medical device, that means that it's useful for the patients to have some instructions, some guidance or some coaching." explains Davis. "Obviously, it's a difficult line to tread for the pharma companies because when does something transition from being educational into promotional? With the community based programmes that we are running, and we expect to launch more of these next year, it is brand free and, essentially, drug and product free so I think it does offer a lot."

"In all disease areas, patients are very keen to share and talk about their experiences. I think that all stakeholders can get something out of that and really benefit from this kind of service."

So what does this mean for the digital maturity of the Pharmaceutical Industry?

"I think there has been some progress made." continues Davis. "I think when we started we were proposing something that was new. Pharmaceutical companies are risk averse in nature and we had to get over some of the hurdles there. Beyond that, it's moved from pilot, but I would argue it's probably moved from pilot to bigger pilot. We are still not seeing it across all therapies and across all companies."

There is obviously considerable potential across many areas of the pharmaceutical industry, as digital processes become standard in clinical trial activities and the deployment of health programmes and communities scale to encompass other disease types and medical conditions.

"On the clinical trial side of things, the overall e-diary or eCOA [electronic Clinical Outcomes Assessment] market is really growing quite rapidly." states Davis. "We're certainly growing quicker than the market, I would say, but I would say that all the other businesses in this space are also doing well. There is a lot of interest from patients for doing things electronically and that is certainly helping us."

"On the health side of things, as I say, we're still doing pilots, larger and larger pilots, but we're doing more than ever before."

Exco InTouch was recently recognised in the Sunday Times Hiscox Tech Track 100 and Tim Davis named as one of the Pharma industry's top 100 most influential figures. The company has also featured on our own Global Digital Health 100 list three years in a row. So what does it take to deliver this level of growth? Davis believes that a combination of investment in technology and a leading development and management team are critical to driving the company's success to date.

"The main things that you firstly have to do with a technology business are invest in overhead, invest in people and ensure that you have a suitable 24-hour support infrastructure. You then need to build your customer profile in order to generate a revenue stream to support that."

"I think we're well beyond that going forward, but that was certainly something that we worked through like any start up technology business did back in the day. Really, from that point and over the past two or three years, it's really just been around us trying to move away from having to actually create lines of code and getting more into a configuration series of modules. When services can be configured, that allows us to do a lot more projects with, not necessarily, having to increase our head count exponentially as well. It's really been about doing more with less, I suppose and letting the technology do the heavy lifting."

Since 2004, the company has worked with many different technology channels to engage digitally with patients and trial participants, but as technologies and trends change what will be the

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engagement channels of the future?

"We get asked this quite a lot," says Davis "Will phones exist in five years? Things like that. I think, probably, yes, is the straightforward answer. We are less concerned about the hardware and so we have built the business on the fact that stuff changes in terms of technology."

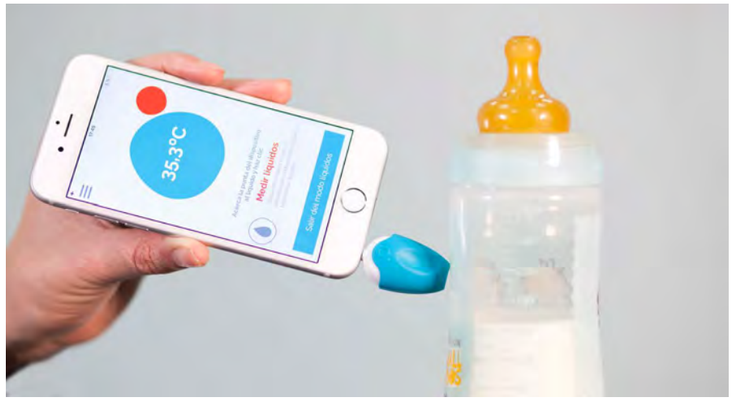
"Having been around for 12 years, that makes us a bit of a veteran, I suppose. It was only halfway through the company's genesis that we saw the first version of the iPhone. Whether Apple stick around, whether Android becomes more commonplace or whether a new operator comes into play, actually, none of that really matters to us. It's basically just, what are the patients using?"

"Will everyone be using their Smart TV in a few years' time? Possibly! I know some people would be very interested in that kind of service and our platform can work with that kind of user interface. We've built the platform to accommodate that kind of consumer shift."

"Regardless of what type of device it is, we will see more and more people having access to a Smartphone. I think, certainly by 2020, you're looking at saturation rates similar to mobile phones around the world. With that we can do an awful lot and then beyond that, whatever the next big drive is in consumer electronics we should be nicely positioned to capitalise on that." ■

Healthcare's Transition from Physical to Virtual

Moving from physical to virtual these days seems an integrative part of our daily life. There is no surprise that today that we can easily get any information needed via our smartphone or start our car while we are still preparing in our bathroom. What in the '70s was thought to be a dream nowadays is our life, a connected one. Personal computers, tablets and smartphones, all these tools have made our life easier.



But it is not just our daily life, which has changed. When we think about the way that health is managed today, it has become much easier to take care of our health through the help of technology.

Innovation has played a crucial role in this, helping to empower patients to take an important role in their own health. This means that we are no longer dependent upon a transfer to the hospital so that the doctor can meet us. Now, with an app on our mobile phone, the doctor can see us in a video call, we can check our temperature's, record vital measurements, or even access our medical history.

The development of new medical devices and equipment, as well as biotechnology, pharmaceuticals, and information technology have all contributed to improving people's health around the world. To think that now we have the opportunity to save lives thanks to artificial organs, robotic prosthetic limbs, and MRI machines or pacemakers. What an evolution!

The main area in which technology has made significant progress to life is the health sector. In it, technological innovation has even led to the increase in life expectancy. Bionic hands, chips that are inserted in the cerebral cortex to return the mobility of any part of the body damaged by an accident, devices that dose medication, mechanical devices that mobilise patients with paralysis, etc.

This year, the mechanical engineer and professor of American Biophysics, Hugh Herr, received the Princess of Asturias Award for Technical and Scientific Research 2016 for his contribution to the development and design of bionic limbs and robotic prostheses. This news highlights the ability of human beings to overcome adverse situations, and the possibilities of research to improve health and people´s quality of life.

Professor Herr is a clear example of the great opportunities offered by biomedical engineering and the advantages that a multidisciplinary approach and teamwork can have in the development of devices and systems that can help to improve cognitive, communicative and physical abilities in people who suffer some form of disability (sensory or motor) or disease.

Technology is incorporated into our lives in a totally invasive way. We all have mobile phones connected to the Internet, devices connected at home, information on servers and all that information is analysed and read. Often for purposes that we do not even know about. We might think that maybe it is dangerous to share more information online from our account, but really the positive side compensates for those fears.

But technology doesn't stop there. Together with a variety of ICT and now the technology built on the Internet of Things, new solutions will be found for a better quality of life and people will have a greater power in their hands. Thanks to the start up concept born in the Silicon Valley, anyone around the world can build an IoT start up. Even in places where you might not even imagine, like having systems around the house and in your fridge that can give you advice regarding the nutritional value of the food… Imagination is our limit here!

And all this is just the beginning. Small devices that are initially only designed to monitor data for viewing on a mobile, are already beginning to collect such large amounts of data that interconnecting them is helping scientific research. The process of collecting this data will become easier, which, in turn, will help generate larger amounts of information. All this may not seem to be such a breakthrough, but really, having a large amount of data, allows behavior patterns to be identified and information obtained from those patterns. Ultimately, this allows for the behavior of individuals to be predicted based upon their own information, and can also allow for the behavior of others to be predicted, thanks to the data.

Meteorological prediction is the application of technology and science to predict the state of the atmosphere for a future period and a given locality or region. The history of the weather forecast is millennial, although the paradigms and techniques used have changed significantly. The forecasts are made by collecting as much information as possible about the state of the atmosphere (particularly temperature, atmospheric pressure, winds, humidity and precipitation) and using known atmospheric processes (through meteorology) to determine future atmospheric patterns. However, the complex nature of atmospheric phenomena and the incomplete understanding of weather patterns and processes make forecasts less secure by increasing the temporal range of the forecast.

A few years ago, it probably seemed to be a crazy thing to hear about a mobile phone that could be used to measure the fever in children. Today this technology, although still surprising, is no longer frightening us.

Thanks to developments and innovation in electronics, mechanics, hardware systems and all other sectors that are involved in technological advances, today we can say that we can do almost anything with a smartphone.

With devices like the Oblumi tapp, you get to monitor temperature shots, and associate these with a profile, where we can know the weight and age and even where that temperature is taken. This means that over time we can generate maps of temperatures and fevers. If this data becomes large enough, then it is possible that we could come to precede diseases or epidermis and thus avoid it happening again.

With no science, no technology and no researching, there is no progress.

Article written by the team at Oblumi ■

Informed, Inspired Care

Lincolnshire Health and Care's Gary James explains how the county's new integrated Care Portal system will help transform healthcare for an ageing and widely dispersed population.

The challenges we are facing today in Lincolnshire are the challenges of the future for the whole UK. As a healthcare system we need to deliver sustainable services for a rapidly ageing population. In Lincolnshire almost 10% of the county is aged over 75 - much higher than the national average. Over 14% of our population live in some of the most deprived areas of England and lifestyle conditions like heart disease and diabetes are forcing us to consider how and where we deliver services.

Like many in the NHS, we're trying to achieve all of this within a financial environment where budgets are increasingly stretched. In Lincolnshire, if we do nothing by 2020 we'll have a deficit of over £300m.

Lincolnshire Health and Care (LHAC) brings together the 13 health and social care organisations including the county clinical commissioning groups (CCGs), acute trusts, mental health, community services, and the local authority. Together we're responsible for the healthcare of over 700,000 patients.

Individually and collectively we need to provide high-quality patient care, while delivering expected efficiencies, but we need to be intelligent about how we change services.

Making arbitrary cuts often creates new problems that can cost more to fix further down the line, so at LHAC we're taking a different approach – putting information sharing at the heart of our plans.

Clinical transformation

In Lincolnshire some of our GP practices have diabetes prevalence in excess of 15% of the population, with patients regularly moving between different healthcare providers. As a result, patient data can be fragmented even within one hospital where

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there can be up to 50 sources of information that a clinician may need to call upon. Across the LHAC area, there is the potential for hundreds of data sources all of which a clinician may need access too.

The Lincolnshire Care Portal is an end-to-end system that will allow clinicians across Lincolnshire to view a shared patient care record, with important health details like current prescriptions, medical history, and details of current and past illnesses.

The introduction of the Care Portal this year, supported by £1m initial funding from NHS England, has the potential to transform the way care is provided in Lincolnshire.

The clinician can see the entire patient journey, as well as lab results, history of diagnoses and visits, procedures, discharge summaries, prescribed medications and more.

Based on InterSystems' HealthShare, the Care Portal sits outside organisational silos. Operating in real-time, clinicians don't just get a simple snapshot, they get a rich and ever changing portrait of a patient's medical life.

Counting the cost

The driving force for LHAC is to identify programmes that will both improve outcomes and save money. We estimate that we will save up to £23m over five years from the initial implementation of the Care Portal, including the avoidance of duplicate tests and x-rays. But it could be more.

Importantly it's worth recognising that the majority of savings will be in time rather than cash. As an example, a hospital pharmacist can take up to 30 minutes discussing a patient's current and past drug regime. With the Care Portal this could be done in seconds.

The Care Portal will help clinicians and their teams work more efficiently. Clearly these efficiencies will have a monetary value, but more importantly the system frees the clinician up to treat more patients in the same time, having an impact on performance too.

Solid sharing

One of the most important challenges for local healthcare organisations is to work together. Devolution in Manchester signals one potential future for local healthcare systems. Even if things don't progress this far, the direction of travel within the NHS is one of increasing cooperation and integration.

LHAC brings together the entire health community in our area with a shared vision for the future. The structure of our partnership enables us to create system-wide, strategic change with clinicians at the centre.

Our own research, and key policy drivers like The power of information, the National Information Board Interoperability Strategy and the Five Year Forward View highlight how a shared care record reduces risk and improves decision making and helps to avoid duplication and waste. Shared information can also be used as a basis for analysis, with detailed patient data used to inform better strategic decisions.

The demands of our local clinicians, and the vision of LHAC, are completely in line with that set out in the Five Year Forward View. When selecting InterSystems' HealthShare we were clear that any system needed to support and facilitate the creation of a 7-day NHS, powered by data.

But the Five Year Forward View isn't just a set of guidelines, it's a shift in focus and one of culture. When we spoke to clinicians, they were already there, challenging us as leaders to provide the support – managerially and technologically – to enable them to change.

On its own the Care Portal is unlikely to completely transform the way we work. But we view it as an important first step toward achieving our shared vision for LHAC.

Patient involvement

We want patients to do more than just consent to their information being shared by healthcare professionals. The Care Portal democratises data, sharing it across systems – but its impact won't end at the hospital or practice door. Our ultimate aim is to involve patients within their own care.

In the future, the new system will include an online portal that will allow all patients to view all their personal health information across multiple care providers, access test results, and see information about their medications. In time, they will also be able to share their records with friends, family and care givers – putting patients in control of their own care.

Where the system can have a huge impact is in supporting shared care planning for conditions like diabetes, or end-of-life care where multidisciplinary teams are involved.

It's easy to get carried away with possibilities. The history of the NHS is sadly full of stories of failed IT projects - but we are confident that the technology now will enable us to take confident steps towards establishing a more joined up healthcare system.

In developing the Care Portal we're investing in our system, our staff and our patients. In so many cases the drive to save money can result in declining standards of care. In Lincolnshire we hope to show it doesn't have to.

Gary James, Accountable Officer, East Lincolnshire CCG ■

Don't miss the
2016 Global Digital Health 100
Awards on page 8

Upcoming Events

5-8 January

CES
Las Vegas, Nevada, USA
For more information visit
http://www.ces.tech

5-8 January

Digital Health Summit (at CES)
Las Vegas, Nevada, USA
For more information visit
https://digitalhealthsummit.com/

11 January

WinterTech
San Francisco, CA, USA
For more information visit
http://www.health2con.com/events/conferences/health-2-0-wintertech-2017/

18-20 January

Social Media in the Pharmaceutical Industry
London, UK
For more information visit
www.social-media-pharma.com

23-24 January

IoT Tech Expo Global 2017
London, UK
For more information visit
http://www.iottechexpo.com/europe

27 Feb - 2 March

Mobile World Congress
Barcelona, Spain
For more information visit
www.mobileworldcongress.com

29-30 March

Emerging Digital Health
London, UK
For more information visit
https://tmt.knect365.com/emerging-health-summit/

3-5 May

Health 2.0 Europe
Barcelona, Spain
For more information visit
http://www.health2con.com/events/conferences/health-2-0-europe-2017/

22-23 May

Digital Health World Congress
London, UK
For more information visit
http://www.digitalhealthcareworldcongress.com

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