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Branding/ Reputation

- EDITORIAL, *L. DONOSO BACH*
- THE ART OF INFLUENCING
- CLICK, LIKE, RETWEET: HEALTHCARE REPUTATION ONLINE, *M. ENNIS-O'CONNOR*
- SOCIAL MEDIA IN HEALTHCARE, *S. SYED-ABDUL*
- SOCIAL MEDIA: GETTING IT RIGHT IN THE MARKETING PLAN, *R. SMITH*
- THE RIPPLE EFFECT: SUSTAINABILITY IN HEALTHCARE, *W. CLARK*

AI AND RADIOLOGY, *P. CHANG*

HAPPY STAFF, SAFE PATIENTS, *U. PRABHU*

QUALITY AND SAFETY: ROLE OF THE BOARD, *L. ROBSON*

QUALITY AND SAFETY IN RADIOLOGY, *L. DONOSO BACH, G. BOLAND*

SPORTS MEDICINE IMAGING, *G. RODAS/ K. NASIF*

THE PAYER DETERMINES, BUT IT IS NOT THE PATIENT, *P. KAPITEIN*

EXCHANGING 'MAMMOGRAPHY' SCREENING WITH 'BREAST CANCER' SCREENING, *N. CAPPELLO*

POINT-OF-CARE ULTRASOUND SCANNERS, *ECRI*

CONNECTING IMAGING AND INFORMATION IN THE ERA OF AI, *D. KOFF*

ELECTRONIC CLINICAL HANDOVER, *J.J. COUGHLAN*

DECONSTRUCTION OF BUSINESS PROCESSES TO DISRUPTION OF BUSINESS MODELS, *P-M. MEIER*

ENHANCING THE PATIENT EXPERIENCE, *D.G. RELIGIOSO, E.S. DECIUS*

ROBOTIC COMPANION ON WARD, *M. KEEN*

BRINGING LIVE MUSIC TO ADULTS AND CHILDREN ACROSS HEALTHCARE, *S. ROWLANDJONES*

HEALTH SPENDING IN GREECE UNDER RESTRAINT MEASURES, *D. LAPPOU*

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Reputation

Taking control of your reputation has become far more complex in recent decades, with advanced technology presenting widespread opportunities. If well choreographed, use of the many tools, platforms and channels on hand can lead to significant strength, propelling your reputation; but if orchestrated badly, your online and offline involvement could actually present damage. Absence or presence from the online community is an initial question to ask yourself, and healthcare providers are increasingly recognising the importance of a positive display of their professional assets across the internet and social media.

A multifaceted approach that spreads across the realms of physical healthcare settings, traditional word of mouth and now also the online community is an intriguing one. In the cover story of this issue, Reed Smith of the Social Health Institute suggests that the best way to maximise each process is to use all of them together. He discusses with us how radiologists can leverage their reputation through a sound social media and digital marketing strategy, pointing out that the clinical leaders of our industry are also the ones leading in the digital and social space.

Technology and artificial intelligence (AI) play a common theme in this issue, since these have become closely linked to successful development and marketing of one's reputation as an imaging professional. AI has, however, also presented an air of mistrust, apprehension and fear within the industry. Some believe that its use in future healthcare will threaten their reputation, and that it may even kill off their profession altogether. In terms of the latter, I agree with something that Curtis Langlotz, Professor of Radiology and Biomedical Informatics at Stanford University said at a tech conference – that artificial intelligence will not replace radiologists. Yet, those radiologists who use AI will replace the ones who do not. With regard to the former, I believe that deep learning algorithms and applications of AI can help radiologists and patients, and will hence improve reputations. AI software has the potential to reduce the burden on a stretched workforce, help in making quick diagnoses and improve quality of care, whilst the initiative and creativity of human radiologists will always be there to manage this and to focus on the most complex issues. The key when it comes to reputation is how you manage this yourself and how you harness the technology and advancements around you.

Within our cover story, we also hear from Marie Ennis-O'Connor, Founder of Health Care Social Media, Ireland, who expresses social media's increasingly important role in maintaining a healthcare organisation's reputation. Patients are looking to the internet to inform their choices on all areas of healthcare, and the online community shares a plethora of good and bad experiences. It is therefore best to take control of your reputation by responding to these conversations yourself and correcting any misinformation or misperceptions, she emphasises. A successful social media presence hinges on the trust between you and your followers, and trust is certainly crucial in the healthcare arena. The healthcare social media specialist also enlightens us on the future of this rapidly changing landscape, where Chatbots and AI will play a much bigger role in automated marketing, much of it via social media.

Alongside this, we have our Winning Practices section that explores a variety of hot topics. Gil Rodas and Khalid Nasif explain how diagnostic imaging has transformed sports medicine, enabling sports people to return to play with confidence. We also hear about a revolutionary use of AI in the field of combating social isolation and improving patients' lives within the hospital. NAO robot companions may well be wandering around your wards in the near future.

We hope that you find this issue of HealthManagement informative and motivational. ■

Lluís Donoso Bach

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What Do You Think?

Healthcare has always had to take special care of its ethics, image, behaviour and communication with the public. In this digital age of instant communication and with a growing emphasis on the personality of both organisations and individuals in healthcare, the sector is under increased pressure to run a watertight operation when it comes to image. How do you manage your professional reputation and that of your organisation? We welcome your thoughts and suggestions. Email us on **edito@healthmanagement.org**

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GUEST AUTHORS

Nancy Cappello, USA
Exchanging 'mammography' screening with 'breast cancer' screening: No refunds or returns for advanced disease, p. 130

Peter Kapitein, The Netherlands
The payer determines, but it is not the patient, p. 128

Gil Rodas, Spain
Importance of imaging in sports medicine, p. 119

Paul Chang, USA
AI and the future of healthcare, p. 90

Marianna Keen, Cyprus
A robotic companion on ward, p. 150

Steve Rowland-Jones, UK
Bringing live music to adults and children across healthcare, p. 152

Will Clark, UK
Green care and reputation, p 114

David Koff, Canada
Connecting imaging and information in the era of AI, p. 137

Reed Smith, USA
Social media: getting it right in the marketing plan, p. 111

John Joseph (JJ) Coughlan, Ireland
Electronic clinical handover: a simple solution to a complex problem, p. 140

Dionysia Lappou, Greece
Health spending in Greece under restraint measures, p. 156

Shabbir Syed-Abdul, Taiwan
Social media in healthcare: opportunities and challenges, p. 108

Geert-Jan Deddens, Netherlands
Point-of-care ultrasound helps save time and lives, p. 126

Pierre-Michael Meier, Germany
Deconstruction of business processes to disruption of business models, p. 144

ECRI, UK
Point-of-care ultrasound scanners: key purchasing considerations, p. 132

Lluis Donoso Bach, Spain
Reputation, p. 81
Lluis Donoso Bach, Giles Boland, USA
Quality and Safety in Radiology, p. 118

Khalid Nasif, Slovenia
Imaging developments in sports medicine, p. 124

Deo G. Religioso, Emmanuel S. Decius, USA
Enhancing the patient experience with video information, p. 148

Marie Ennis-O'Connor, Ireland
Healthcare marketing online, p. 104

Umesh Prabhu, UK
Happy staff, safe patients, p. 94

Daniel Forsberg, USA
AI and ML applications in healthcare, p. 93

Lucie Robson, Cyprus
Quality and safety: the role of the board, p. 98

TABLE OF CONTENTS

HealthManagement • Volume 18 • Issue 2 • 2018

EDITORIAL

81 **Reputation**
Lluís Donoso Bach
Imaging Editor-in-Chief, HealthManagement.org

SPOTLIGHT

90 **Artificial intelligence and radiology: human-machine collaboration is key**
Should radiologists be buying into the hype about artificial intelligence? HealthManagement spoke to Prof. Paul Chang about AI, deep learning and the advantages of intellectual arbitrage.
Paul Chang, Professor of Radiology, Vice Chair, Radiology Informatics Medical Director, Enterprise Imaging, University of Chicago, USA

POINT OF VIEW

93 **AI and MI applications in healthcare**
From the algorithm sandbox to the clinical wilderness.
Daniel Forsberg, Senior Research Scientist, Sectra

122 **RS 85:** *A new and outstanding premium ultrasound system*
GM85: *Experience Optimized Workflow with Samsung's Mobile Digital Radiography* Samsung

126 **Point-of-care ultrasound helps save time and lives**
Geert-Jan Deddens, Nurse Practitioner in Emergency Care, Rotterdam Ambulance Service, The Netherlands

DISCLOSURE:
"Point of View" articles are part of the HealthManagement.org Corporate Engagement Programme

MANAGEMENT MATTERS

94 **Happy staff, safe patients**
Leading NHS medical director on what a hospital can do to improve patient safety - yesterday.
Umesh Prahbu, Former Medical Director, Wrightington, Wigan and Leigh NHS Foundation Trust, UK

98 **Quality and safety: the role of the board**
Boards should lead quality and safety improvements.
Lucie Robson, Senior Editor, HealthManagement.org

COVER STORY : REPUTATION

102 **The art of influencing: what's behind the phenomenon?**
Top influencers from the healthcare field weigh in on what it has taken to establish credibility in their niche.

104 **Click, like, retweet: healthcare reputation online**
Leading healthcare social media expert gives rundown on how online presence should not be left to chance.
Marie Ennis-O' Connor, Founder - Health Care Social Media, Ireland

108 **Social media in healthcare: opportunities and challenges**
Tips and pointers from FutureLearn trainer on optimal use of social media for crisis management, patient engagement and preventive healthcare.
Shabbir Syed-Abdul, Associate Professor, Health informatics, Taipei Medical University, Taiwan

111 **Social media: getting it right in the marketing plan**
What healthcare can do to leverage their reputation through a sound social media and digital marketing strategy.
Reed Smith, Founder, Social Health Institute, San Antonio, USA

114 **The ripple effect: sustainability in healthcare**
Developed by Sussex Community NHS Foundation Trust, Care Without Carbon is an award-winning healthcare sustainability model, which has impacted positively on reputation.
Will Clark, Director of Environment and Transformation, Care Without Carbon, Sussex Community NHS Foundation Trust, UK

117 **Reputation in healthcare infographic**
An overview of reputation and branding in healthcare.

WINNING PRACTICES

118 **Quality and safety in radiology**
In a soon-to-be released book, experts offer their knowledge and guidance for optimising quality and safety in radiological practice.
Lluís Donoso Bach, Editor-in-Chief Imaging HealthManagement.org – The Journal, **Giles Boland**, Chair, Department of Radiology Brigham and Women's Hospital, USA

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TABLE OF CONTENTS

HealthManagement • Volume 18 • Issue 2 • 2018

119 **Diagnostic imaging in sports medicine**
How diagnostic imaging can be used in sports medicine and different techniques can used to assess muscle injuries.
Gil Rodas, Medical specialist, FC Barcelona, Spain

124 **Imaging developments in sports medicine**
The official doctor for the Slovenian athletics team speaks to HealthManagement.org about how emerging technologies have made a positive impact on sports medicine and resulted in more precise diagnostics.
Khalid Nasif, Doctor of Osteopathy, Head of the Medical Department at Terme Catez, Doctor of the Slovenian Athletics Team, Slovenia

128 **The payer determines, but it is not the patient**
In healthcare patients are not consumers with the economic power they have in other markets, but the arguments for patient involvement are compelling.
Peter Kapitein, Patient Advocate, Inspire2Live, the Netherlands

130 **Exchanging 'mammography' screening with 'breast cancer' screening**
Without a shift to a personalised breast cancer screening programme, participation rates in mammography screening may further decline.
Nancy Cappello, Founder & Director, Are You Dense, Inc. & Are You Dense Advocacy, Inc., USA

132 **Point-of-care ultrasound scanners: key purchasing considerations**
While several vendors now market scanners that are specifically intended for POC applications, ECRI offers an in-depth round-up of which scanners will best meet your facility's current clinical needs.
ECRI Institute, UK

137 **Connecting imaging and information in the era of AI**
This year's exciting Medical Imaging Informatics and Teleradiology conference will feature talks on imaging in an EMR-centric enterprise, radiology service outreach for physician engagement, using imaging informatics in quality initiatives, artificial intelligence as well as many other trending topics in the field.
David Koff, Professor and Chair, Department of Radiology, McMaster University, Radiologist-in-Chief Diagnostic Imaging, Hamilton Health Sciences Hamilton, Canada & HealthManagement – Imaging Editorial Board Member

140 **Electronic clinical handover: a simple solution to a complex problem**
Implementing electronic clinical handover in a hospital for better patient safety.
John Joseph (JJ) Coughlan, Specialist Registrar, Cardiology, Department of Cardiology University Hospital Limerick, Ireland

144 **Deconstruction of business processes to disruption of business models**
How healthcare IT can impact business models.
Pierre-Michael Meier, Executive Vice President and CSO, März Internetwork Services AG, Germany

146 **Enhancing the patient experience with video information**
How the use of video information and modern-day devices can help with patients who are dealing with anxiety in anticipation of radiology testing and treatment.
Deo G. Religioso, Lead Technologist, Nuclear Medicine Services, Boca Raton Regional Hospital, USA, Emmanuel S. Decius, Lead Imaging, Support Services, Boca Raton Regional Hospital, USA

150 **A robotic companion on ward**
Fighting hospital patient isolation is the aim of a talkative robot.
Marinanna Keen, Staff Editor, HealthManagement.org.

152 **Bringing live music to adults and children across healthcare**
Founded in the same year as the NHS and celebrating its 70th birthday in 2018, the UK charity Music in Hospitals & Care continues to deliver the benefits of live music to adults and children right across the healthcare sector.
Steve Rowland-Jones, Chief Executive England, Wales, Northern Ireland & The Channel Islands, Music in Health & Care

COMPASS

156 **Health spending in Greece under restraint measures**
Way forward for sustainability of healthcare sector
Dionysia Lappou, Assistant Surgeon, Sismanogleio - Amalia Fleming General Hospital, Greece

I-I-I BLOG

160 **Hugo Saner**
Congress Director - European Congress on eCardiology and eHealth

Karl Brauner
Deputy Director-General - World Trade Organization

Arnaud Hansske
Executive Director of the medical information department and the Kashmir Lab, CIO, France

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Artificial intelligence and radiology

Human-machine collaboration is key

Should radiologists be buying into the hype about artificial intelligence? HealthManagement spoke to Prof. Paul Chang about AI, deep learning and the advantages of intellectual arbitrage.

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How are artificial intelligence (AI) and deep learning shaping radiology?

In healthcare in general, and radiology in particular, we tend to buy very early into the hype surrounding any new potentially disruptive technology, whether that's Picture Archiving and Communication Systems (PACS), speech recognition or big data. But it takes us much longer to appropriately consume and actually influence 'real-world' radiology. Because we are behind other business verticals in achieving human-machine cybernetic harmony we tend to buy into the hype where we think that AI is going to either save us or replace us as radiologists. We tend to overpromise the technology benefit or overestimate the potential harm or threat. For example, we heard similar arguments when we talked about PACS—"we are now hamsters in wheels, we've lost the ability to collaborate with our patients and our clinicians", and so on.

We have always had human-machine cybernetic collaboration. Cybernetics is essentially how humans work within complex systems to achieve their goal, and it predates AI and even computers. I could not function as a radiologist without PACS, speech recognition and the electronic medical record (EMR). These are information systems that are examples of human-machine cybernetic collaboration to achieve something positive. AI, machine learning and deep learning are evolutionary (and I believe necessary) next steps to these systems.

Today radiologists and physicians are knowledge workers, who work with electronic information systems and other machines in a very complex collaboration to try to achieve desirable patient outcomes. Unfortunately, frequently we have impedance mismatches; we have inefficiencies and immaturities in the system and immaturities in how we work with information technology.

In other business verticals deep learning is ubiquitous and has been used for several years to achieve efficiencies, reduce variability and improve quality. And despite the misconceptions people have, it tends not to replace people but augments people.

We will eventually learn to appropriately consume AI and deep learning technology and work together in a cybernetically balanced way. It just takes us a lot longer in radiology.

Why do you think radiology needs to embrace AI and not fear it?

AI is neither a saviour nor a horrible threat. It's like any other disruptive technology. We will learn to appropriately consume it after going through the hype curve. In the USA radiologists are barely managing their workload, and are susceptible to burnout. Our datasets are becoming much larger, and the challenges are not just the number of images but their complexity and multispectral nature. It's a good problem from one perspective, as we can obtain much more actionable and relevant information to help positively impact patient outcomes. One of the reasons radiologists embraced PACS, even though in many ways it was more disruptive than AI, was that film-based analogue image interpretation made the application or interpretation of MRI, CT, PET, the modalities we take for granted now, impossible. That's one of the reasons we embraced PACS and take it for granted now.

Unfortunately, PACS and just the electronic distribution, management and display of images are no longer sufficient as there is so much more complexity in the image dataset. Radiology is more than interpreting images, it's about managing the role of imaging in a highly complex environment where our clients are much more demanding. Extra demands from the healthcare enterprise are putting an incredible burden on radiologists, resulting in burnout, inefficiency and variability in quality. Whatever we embrace, whether it's AI, machine learning or deep learning, we are going to need some help from advanced IT.

Because we are ten years behind other industries in adopting these technologies, by the time radiology and healthcare adopt them appropriately we will

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have taken them for granted in other parts of our lives. Amazon, Google, Siri and Alexa are getting much smarter now. Why? Deep learning and AI. The application of machine intelligence in other parts of our lives is already ubiquitous. My refrigerator will soon be more intelligent than my PACS and tell me if the vegetables are spoiled and ask if it would like me to reorder them.

In medicine, by the time we actually adopt AI and deep learning it will be so pervasive in other parts of our lives that we will perceive it as 'no big deal'. It's going to take a lot longer than many anticipate to appropriately embrace it in radiology; unfortunately, because we buy early into the hype, that gives us plenty of time to ride the hype curve. I don't think we should fear AI. The status quo where the bulk of the task is left to the human knowledge worker is no longer viable.

"Intellectual arbitrage is the best risk mitigation strategy". Please explain.

With intellectual arbitrage, we can use the experience of other industries that have adopted AI and deep learning to apply it to radiology. Arbitrage exploits incomplete distribution of information or experience. Radiology and healthcare's future is the past or present of other industries. When we look at other business verticals, without exception they bend over backwards to build human-machine cybernetically optimised IT collaboration workflow. They ensure that humans work on what they do best and reduce the system's vulnerabilities and dependence on what humans do poorly. As humans we can do extraordinary things, we can make incredible judgments with incomplete or inaccurate information, and we can have true insight. But we are terrible at remembering, and at initiating workflow. For example, you never want to rely on a human to do things like remember to follow up a nodule that might be cancer, or remember that a patient is being seen in clinic today so their study needs to be interpreted now. Other business verticals make sure that humans are not placed in that position. Machines can do the "left brain" stuff better.

"DEEP LEARNING IS LIKE HAVING THE FASTEST RACE CAR IN THE WORLD. BUT EVEN RACE CARS NEED GASOLINE AND ROADS; WE HAVE NEITHER AT THIS TIME"

The whole idea of human-machine cybernetic collaboration is that IT takes over what humans are bad at, such as remembering things. That leaves the human to do what they do best, and that is to understand what needs to be done for the patient, prioritise what is important, gain insight and help patients. That's not a threat to a radiologist, that's being complementary and other industries do it very well. People who are threatened by AI need to understand that this is a natural evolution of human machine collaboration, even predating computers. For example, eyeglasses and slide rules are both examples of human-machine cybernetic collaboration, so it's nothing new.

The problem with healthcare and IT is that we tend to force knowledge workers to initiate workflow. That's an example of an impedance mismatch or suboptimal human-machine cybernetic collaboration or harmony. Our IT systems still require humans to do the right thing. If you look at PACS and our other IT systems, we use the same computer and monitors as other industry verticals; we have very similar software and databases as other industry verticals. But we are behind by ten years in optimised human-machine cybernetic collaboration where the IT and machine parts do what they do best and where humans do what they do best.

Being ten years behind other industries on AI and deep learning is not a bad thing. The reason we got away with it is that before shared risk and capitation, with fee for service there was no true competition. It upsets me when physicians say that hospital IT is "stupid." We're not stupid. We're actually quite rational. In the days of fee for service it was irrational to invest any resources to have a differential advantage in IT. However, now that we have shared risk and capitation, we're competing in earnest, and IT has to be more strategic, and our managers have to be more aggressive in looking at how we can achieve a differential competitive advantage by leveraging and optimising human-machine cybernetic collaboration.

To understand how best to achieve human-machine cybernetic balance all I need do is look at other industries. It's the best way to mitigate risk. The problem is we don't do it. We tend to recapitulate the errors of early adopters, including buying into hype. For example, much of the hype is coming from data scientists who, with the help of hardware graphics processing unit (GPU) assistance, can now create very impressive deep learning systems. Some are even boldly claiming that human radiologists will soon be obsolete, replaced by these powerful creations. However, building the best deep learning system in the lab is not enough. Even if you assume that it is possible to create a deep learning system that will be a better radiologist then humans (a very strong and I believe suspect assumption), it is like building the best race car in a world without gasoline or roads. Even the best race car needs gasoline and roads.

What is the "gasoline" for AI? It is vetted annotated data (ground truth) required to train these algorithms. And the "roads" for AI is optimised integration into our existing operational workflow. Currently, we aren't even close to providing either the "gasoline" or "roads" to supply AI at scale or clinical relevance. This is one of the reasons I believe we are still very early in this journey.

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I think another reason that contributes to the hype is how folks attempt to explain how AI, especially deep learning, works. Here's a drinking game for you: the next time you hear someone give a lecture on deep learning, you get to drink a beer whenever they show a picture of the neuron and then attempt to describe neural networks in some spooky magical anthropomorphic way. For many, that just adds to the level of discomfort folks have in trusting these systems. The way I teach deep learning is explaining that the methods involved have less to do with our modern neurobiological understanding of the neuron but are more related to traditional data mining statistical methods. In fact, a number of experts in the AI field have stated that deep learning is "logistic regression on steroids." This is of course an over-simplification, but a useful way to introduce deep learning to many of us in radiology.

Another way to introduce folks to deep learning is to start with traditional machine learning. In radiology we've had computer-aided detection (CAD) for a decade in breast and lung imaging. Did we hear any hype about CAD replacing us? No. These tools have always been viewed as augmentation helpers to the human radiologist. CAD is a classic example of machine learning and of traditional artificial intelligence. The key point about traditional machine learning is that these approaches typically require a very clever human being to come up with an a priori feature model that ideally differentiates between, for example, cancerous lesions versus benign ones. For instance, Dr. Maryellen Giger with her team from the University of Chicago was one of the pioneers to come up with machine learning algorithms for breast CAD. She, working with radiologists, developed an a priori feature model and based on that model used image processing methods (convolutional filters, etc.) to extract those features from images and then used statistical methods to come up with a prediction model.

In a way, deep learning is actually the dumber, brute force cousin to CAD. There is no preconceived feature model; it is replaced by lots (and I mean LOTS) of annotated training data. By using lots of vetted ground truth data and applying methods similar to traditional statistical methods (logistic regression, gradient descent, etc.), the deep leaning system can come up with an acceptable prediction model the same way feeding data to a linear regression model can come up with an acceptable prediction model. The real "deep" power comes from the ability to "chain" these statistical methods together to form multiple layers of analysis, powered by hardware graphic GPUs.

This dependence on LOTS of vetted training data (the "gasoline") is one of the reasons other industries have invested significant resources to build scalable and interoperable IT infrastructures to feed these AI systems. This is one of the most important "intellectual arbitrage" opportunities for us in radiology: we need to do the same: it is a great "hedge" strategy for health IT administrators.

You have said that you would advise CIOs in healthcare systems to move away from an EMR-centric view. Please comment.

Radiologists, CIOs and CEOs ask me what they should do on AI. I say that it's too early to pick a winner in AI, but in the meantime you can start "drilling for gas, and building roads." The strategy should be to build up IT infrastructure to be more strategic, interoperable, scalable and capable. Our IT infrastructure in hospitals is very primitive relative to other industries. It tends to be EMR-centric, PACS-centric and siloed, with no interoperability. We need to apply intellectual arbitrage and look at how other industries have built their IT stacks.

Without exception every other business vertical, whether it's Amazon, the military, banks or the pizza shop over the road, does not do it the way we do. What we have is a monolithic EMR and PACS. What they have is service-oriented architecture or microservices. They have much more agile and capable strategic IT infrastructure with better interoperability; as a result they have the ability to "appropriately consume" AI, big data and other advanced IT applications. We need to do the same. ■

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AI and ML applications in healthcare

From the algorithm development sandbox to the clinical wilderness

Daniel Forsberg
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Today, far too many articles and blog posts suggest that artificial intelligence (AI) and machine learning (ML) is some sort of magic pill that can easily be taken to ensure that all and any problems within healthcare will disappear overnight. However, change is difficult and often a slow process. It is not surprising to see today's AI and ML hype with great hopes and expectations surrounding it, but where actual implementations and deployments in clinical practice is more of a dream than a reality. One of the reasons to this is because of the divisive chasm between the controlled sandbox where algorithm development happens and the clinical wilderness where healthcare happens.

Moving from the algorithm development sandbox to the clinical wilderness is associated with several challenges:

1. Providing and demonstrating clinical value
2. Accessing relevant training data
3. Building user-friendly AI/ML applications
4. Deployment and integration with clinical workflows

Providing and demonstrating clinical value

To develop algorithms that will be used in clinical care, the developers/researchers need to focus on problems that are of importance to the end users (the healthcare personnel), the management of the end users or the customers of the end users (the patients). For example, will the algorithm make the physicians more efficient or even more effective, or will it allow the physicians to provide care that was not earlier possible to provide?

Accessing relevant training data

"Data is the new oil!" We have all heard this and it is especially true for ML where access to data is key when training new algorithms. Over the past decade a lot has happened in terms of open access and making even medical image data available. For instance, The Cancer Imaging Archive or Grand Challenges in Biomedical Image Analysis are great sources for anyone looking for medical image data to train their algorithms. However, these sources can only get you so far as the data is often limited in number of samples and sources. Hence, to ensure robustness of any trained algorithm, it becomes important to establish access to additional data sources.

Building user-friendly applications

An ill-designed user interface can render an excellent algorithm useless, whereas a well-designed user interface can turn a mediocre algorithm into a highly useful tool. Another aspect of this is that algorithms are not perfect. Hence, user friendly AI applications that ensure that failed predictions are easily spotted and handled are essential, especially in healthcare.

Deployment and integration with clinical workflows

Healthcare IT is not what it used to be decades ago. Today's healthcare IT is a lot more standardized and with significantly more security routines in place, which is good, but which makes it difficult, especially for non-established entities, to deploy their new AI applications. What kind of HW and SW will the application run on? Will the application run on premise or in the cloud? How is access to protected health information handled? Who will have access to this information? These are just some of all the questions that will be asked by the healthcare IT team.

Once the questions related to the deployment have been handled and answered satisfactorily, there is still the challenge of integrating your AI application within an existing workflow. For example, switching workstations to access another application is most of the time out of the question, and even switching applications on the same workstation is frowned upon. Both aspects, deployment and integration, will be a lot easier to handle with an IT system in place capable of integrating 3rd party applications through standardized protocols and interfaces. ■

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Happy staff, safe patients

An Interview with Dr. Umesh Prabhu

Leading NHS medical director, Dr. Umesh Prabhu on what a hospital can do to improve patient safety – yesterday.

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Patient safety is a critical area of focus for all healthcare institutions, requiring involvement from all levels, from the Board to individual staff members on the frontline, Dr Umesh Prabhu, the former Medical Director, Wrightington, Wigan and Lehigh National Health Service (NHS) Foundation Trust (2010-2017) and Bury NHS Trust (2001-2003) gives us his thoughts, and tells us how he helped to transform the Trust into one that reduced harm to patients by 90 percent just in 8 years.

Should patient safety be more of a priority in healthcare?

It was nearly 160 years ago, Florence Nightingale said: 'The very first requirement of a hospital is that it should do the sick no harm."

Anything which focuses on safety and quality will never go wrong. In Wigan, the Trust was like any other Trusts - focused on finance and target. Both are important, because it is public money and the Trust has statutory duty to spend public money wisely and to achieve the targets.

In 2007, the CEO, Andrew Foster, attended an Institute for Health Improvement (IHI) conference in the USA and he decided to make patient safety the top priority. There were some successes but, underneath there were some cultural challenges.

I joined the Trust in 2010, as the Medical Director and in 2011, the Trust staff feedback survey showed that the Trust was in the bottom 20 percent for staff happiness and that was the burning issue. The Trust decided to embark on staff engagement and a 'Listening into Action' programme. The Trust also decided to focus on culture of staff happiness, staff and patient engagement.

A leader's job is to create a culture of staff happiness so that staff can do a good job. Leaders must achieve both financial balance and targets by working with staff. The more we listen to and engage staff, the more they will be able to deliver good, safe and effective care to their patients.

When the Trust focuses on finance and targets, its puts staff under tremendous pressure. Whereas if the Trust listens to staff and creates a culture of staff happiness, then the Trust can work with the staff, understand their day-to-day pressures and pains and solve them through collaboration with personnel.

When I joined the Trust, I realised that the Trust had many hard-working staff, but many were demoralised. Unhappy staff equals unhappy patients. The culture of any organisation is decided by few dominant individuals. It may be the Chief Executive, finance director or nurse or medical director and this is where the differences lies as to what is given the top priority in any Trust.

In 2011, the Trust started listening to its staff, appointed some very good medical, nursing leaders and managers and implemented good governance. They focused on staff and patient engagement, transformed the Trust and learnt lessons.

> "ONLY 20 PERCENT OF LEADERS ON A TYPICAL UK NATIONAL HEALTH SERVICE (NHS) BOARD ARE CLINICAL. THAT IS A MISTAKE"

For patients to receive the safest and the best care, we must create a culture of staff happiness and we must care for our staff.

Good team working is essential for good patient care. Good teams are led by good leaders, who are kind, caring, compassionate but are also self-disciplined and those who work hard and lead from the front and lead by example. These are the role model consultants or nurses or physios or other staff in the team.

To transform our performance, I asked nurses, GPs, junior doctors, SAS doctors and consultants:

Who is the best consultant in the department?

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Who is a nice human being?

Who is a good team player?

Whom do you want to see as a leader and why

I always ask why questions. Why is the most important question in our life. Why makes us think. Why do I want to be a medical director or a nurse director? Why do we think someone is the right person to do the job?

When I asked these questions, in each department, staff nominated only one to two names for leaders. This is because, in each department there are only one or two popular doctors and these are the leaders of that department or the division.

When I met these doctors in 2010, nearly 60 percent of them did not want to be leaders. This is the sad irony of our NHS. Most good doctors who have the ability to be leaders, do not want to be leaders and the reason is simple: we do not train, or encourage good doctors to be good leaders nor do we train or nurture them to be leaders.

The current training, we provide for any clinical staff to be leaders, is management training. If we provide management training for leaders, then all we do is produce more managers and not more leaders.

Managers manage the task whereas leaders inspire, motivate, help, support, guide staff to be at their best. NHS needs more and more leaders and not more and more managers. Of course, the NHS needs good managers to be good leaders and this can transform NHS.

Today, only 20 percent of leaders on a typical NHS Boards in an acute sector are clinical staff and the remaining 80 percent of Board members are 'non-clinical. They tend to focus on targets and finance and less on safety or quality.

When you started your medical career, did you think that patient safety would become such a huge part of your focus?

Absolutely not. I had no training in patient safety or quality. I was trained to be a doctor - a paediatrician - and the whole focus was on clinical care. There was no training in patient safety, quality, quality improvement, dealing with complaints, finances, or dealing with difficult colleagues or team working or even basic communication skills.

I had excellent training to be a paediatrician, but I had a very strong personality. Even as a child I had a very strong personality, because of my grandma who brought me up in a small village in India. She was a follower of Mahatma Gandhi, and she told me always be honest and always be sincere, see good in others and do good to others, only focus on you and keep on learning and one day you will be somebody. She also told me that whenever you do something right, don't be afraid of anybody. Courage is the most important quality for someone to succeed as a leader.

With that, I came to UK in 1992. I had finished my basic undergraduate training and Diploma in Child's Health in India. I passed my PLAB exam conducted by GMC and worked in Manchester, Leeds, Edinburgh and Oxford, obtained further training and passed all my exams. In 1992, I was appointed as the Consultant Paediatrician at Fairfield General hospital, Bury.

Within two months of becoming a consultant, I was asked to be the clinical lead for the Paediatric department and I headhunted consultants with my own values. With the help of my colleagues, we built an excellent department. We told the nurses that, in case of an emergency, they could call any one of us and we would be there. Over next 18 years or so, I was twice called at night even when I was not on-call and both occasions I was able to save the babies.

We realised good team working was essential for good patient care.

Where did your passion for patient safety start?

It was in 1992. Within a short period of being a consultant, I made a serious mistake and a six-week-old baby developed severe brain damage. I had seen the baby in the ward round and baby had a very faint mark on the penis. I was not sure whether it was a 'birth mark' or a faint bruising. As I was not sure, I asked junior doctor to arrange special X-ray called skeletal survey. This X-ray would indicate if there were any fractures, which would support the diagnosis of 'child abuse'.

Unfortunately, my junior doctor did not realise, there were two babies with the same name and same age. At the end of the ward round, he picked up the wrong case notes of another baby with same name and wrote the request form for this second baby. He gave the request form to the nurse who was not in my ward round and she did not realise she was taking the wrong baby for the X-ray.

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Dr. Prahbu at UK Care Quality Commission Board Meeting in London, 2015

She brought the x-ray and gave it to the sister who was in my ward round and sister thought it must be the X-ray of baby I had requested and hence filed it in the wrong baby's file. I saw the X-Ray and it was normal so sent the baby home without realising the baby did not have an X-ray. The stepfather was abusing the baby and within a day or two he stamped on the baby's skull and the baby was admitted with severe brain damage.

My colleagues from the neighbouring hospital where the baby was admitted rang me and she told me that the baby was severely brain damaged and had multiple rib fractures and some of them were old fractures. I was devastated and called a meeting to understand what went wrong. I realised five things had gone wrong so I put systems in place and thought that was the end of it.

"LEADERSHIP IS ABOUT GIVING THE BEST CARE TO EACH PATIENT; TO PROVIDE THE BEST CARE, YOU NEED THE BEST TEAM"

Sadly, within six weeks another baby died due to doctors' and nurse's mistakes. I had not made any mistake, but I was in charge of the baby. This baby had severe Respiratory Distress Syndrome (RDS). Three things went wrong, and the baby died.

Both these tragedies affected me a lot and hence took keen interest in patient safety and it took over my whole life.

Being a doctor is a big responsibility and I wanted to understand why doctors make mistakes and harm patients. I wanted to understand how we can protect patients and protect doctors and the team.

When a patient suffers serious harm due to 'medical errors' it has huge impact on patients their families and the doctor and his/her families.

As doctors, we know that prevention is always better than cure. Each human being makes five to seven mistakes every day so, we cannot stop doctors, nurses or our staff from making mistakes. But we must make sure patients do not suffer because of the mistakes made by our staff.

My interest in patient safety led me to organisational culture, leadership, good governance, subconscious bias, institutional racism, culture of bullying, harassment, professional regulation, impact of poor team working and why doctors and nurses make mistakes and victimisation.

Please tell us how you have reduced harm to patients in Wigan by 90 percent?

At the outset itself, I would like to thank many wonderful staff of Wigan. It is their hard work and sincere commitment to patient safety and the quality that transformed the Trust. I also want to thank the Trust Board, the CEO Andrew Foster, the two Chairman, Wigan Council, Wigan CCG, Wigan GPs and Bridgewater and five Borough's Trust.

Success is when we all work together for a common purpose. CEO Andrew Foster's commitment to patient safety helped me a lot and the Trust Board appointed some amazing Non-Executive and Executive Directors who all contributed to the transformation of the Trust.

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The Trust focused on staff and patient engagement, good values-based leaders and managers, patient safety champions, dementia champions and focused on good culture, good governance, good team working.

In 2010, I personally met many consultants individually, SAS and junior doctors in small groups and GPs and nurses in small groups. We made some significant changes to the way the Board members interacted with staff. The Board members became visible, approachable and started meeting staff and all these changes were fully supported by the Trust Board members.

We started sending nice emails to our staff to create positive energy, thanking them and praising them for all their hard work and sincere efforts. The whole Board, including the CEO and the Chairman started telling staff 'don't do it if it is not safe to do so'. This empowered staff and managers. Staff spoke to someone senior if they were concerned about anything which was putting patient safety or quality of care at risk. Having many kind, caring and compassionate senior leaders and managers helped the Trust to transform the culture.

To a good leader, everyone matters and every voice counts. A good leader listens to each staff member and inspires, motivates, helps, supports and guides to get the best out of fellow human beings. Transformation needs transformational leaders with great vision, charisma, knowledge and skills.

What advice would you give both individual physicians and hospital departments facing a patient safety crisis?

I would say two things. Do not worry where you are today. It is important to know where you want to be tomorrow. Secondly, to get to know your organisation, you must talk to people who are on the frontline.

Work with your team, identify the challenges in the department. Ask staff, engage them and understand the challenges your team is facing. What are the main concerns, how do we improve patient safety? Start base line measurements, have a dashboard to each department, identify the nature of patient safety concerns, put measurements in place. Measure what matters to patients, engage patients and carers and engage staff and start improving things.

In Wigan, it was brilliant 'Listening into Action', staff and patient engagement, excellent governance and good working relationships with CCGs, Primary Care, Mental Health, GPs, CCGs, Community Trust and Mental Health and Wigan Council which really transformed the Trust. In Wigan, we also encouraged frontline staff to be patient safety champions.

A leader's and manager's job is to make staff members' jobs easy. As such, our staff work very hard and there is acute shortage of well-trained doctors, nurses and other staff. The NHS must transform itself and use the skills of other staff. The NHS must also invest in digital health, digital transformation. If there is a good IT department working with good doctors and nurses and if a

What role does patient safety play in a hospital's reputation?

The NHS is a very safe Institution. Each year, there are 360 million visits supported by 1.3 million staff. In 36 hours, approximately 1 million patients are seen by nearly 40, 000 GPs. The majority of these patients receive safe and the best care. However, each year 20,000 patients die, and 55,000 patients suffer for more than six months or are permanently disabled owing to 'medical errors'. Nearly 80 to 90 percent of these are preventable.

It is important that we, the NHS leaders, focus on preventing these human tragedies and make sure every patient gets the safest and the best care.

Success is when we all work together for a common purpose and our purpose is always our patients, the fellow human being irrespective of race, gender, ethnicity, disability or religion. It is they who must get the safest and the best. ■

KEY POINTS

- ✓ Focusing on patient safety and quality will always lead to better all round performance
- ✓ In any organisation, 2 or 3 individuals set the tone of the culture
- ✓ Only 20 percent NHS board leaders are clinical which leads to viewpoint and priority imbalance
- ✓ Good governance is essential for successful hospital operation
- ✓ Physicians need more leadership training
- ✓ Listening to frontline staff ideas for solutions reaps beneficial results
- ✓ Digital transformation could make healthcare cheaper
- ✓ Happy staff helps to support happy and safe patients

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Boards should lead quality and safety improvements

A new framework for active involvement

A new framework from Health Service Executive supports hospitals in aim to improve care quality and safety.

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As hospitals try to drive rapid improvement, boards have an opportunity and a responsibility to make better quality of care the organisation's top priority. This critical partnership between broadly-focused executive leadership teams and highly-engaged boards is something which the quality improvement division of Health Service Executive (HSE) have shone the spotlight on; thus they have formulated a new and awakening framework that boards can utilise as a resource for being active in improving the quality and safety of care that exists across the healthcare sector.

"A Board's Role in Improving Quality and Safety: Guidance and Resources" provides many illustrative real-world examples of process and outcomes of successful boards in action, considering a range of challenges facing boards, and providing a practical insight for boards to develop and better discharge their responsibilities towards consistent quality and safety in healthcare.

The "Oireachtas Committee on the Future of Healthcare: Sláintecare Report" (2017) recognises the key role of boards and advocates the establishment of healthcare boards. As such, this guidance will assist new and existing boards in using practices which support positive decision-making, governance and accountability; where service users' needs come first in a culture of person centredness.

HSE's review of the literature has identified many key findings, ranging from principles for effective boards to the importance of creating a culture of trust by working together. The guidance has been developed with reference to international leading practices which have included a review of relevant

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publications and material from the UK, USA, Australia, Canada and New Zealand.

A Shifting Role

The opinions of many board members were taking into account when developing the framework, with a Canadian board chair reflecting: "There has been a real shift in emphasis [over the last decade or so] from processes to outcomes. It is a board's responsibility to ensure the right "processes" are in place; however, the real value a board brings, or that a highly functioning quality committee adds, is on understanding outcomes and variation in care and or improvement over time. Patient stories are very helpful but are most helpful if tied to an indicator or initiative that is in front of the board."

> "PATIENT STORIES ARE HELPFUL BUT ARE MOST HELPFUL IF TIED TO AN INDICATOR OR INITIATIVE IN FRONT OF THE BOARD"

Key to the proposed environment is a trusting partnership, which is something that any organisation can benefit from, to provide motivation and an impetus to actively progress. The board is key to this overall positive relationship, and its responsibility for ensuring and improving care cannot be delegated to the medical staff and executive leadership, but needs to be tackled face-on, with a shared agenda and understanding. This leadership can set system level expectations, improve accountability for high performance and elimination of harm, and if properly conducted, can dramatically and continually improve the quality and safety of care.

The guidance resource emphasises the appointment of board members with the right skills and values as highly important. A Canadian board chair commented: "While you can grow your own experts in the area of quality and patient safety, it helps if you are very clear identifying the types of skills and experience required when recruiting and appointing board members. I would strongly recommend recruiting at least a couple of people onto boards, where possible, who have manufacturing or transportation backgrounds with proven continuous improvement orientation. Also, adding people with strong customer service backgrounds, not just in delivery but in fundamentally understanding how to imbed a service ethos into staff.

With a superior selection of board members and the increased quality of data being shared with the board, the momentum via this new framework is positive. An Irish board chair highlighted: "The board now get a balanced view of information and a more comprehensive picture of finance, access and quality of clinical care delivered to patients. The information is presented via a board of directors' quality dashboard. All of the information is represented on one page, grouped by quality domains and aligned to the National Standards for Safer Better Healthcare (HIQA, 2012) and the board quality and safety priorities. The dashboard and accompanying report are circulated prior to the board meeting and provide us with context to the information and enables us to be prepared for a focused discussion at the board meeting.

This resource is designed for use across all types of healthcare providers, including Hospital Groups as well as voluntary HSE funded Section 38 and Section 39 organisations. It may also be useful to providers without boards since the information can be utilised by executive management teams and clinical leaders.

Seven Leading Practices

Each of the seven leading practice sections of the framework describes the rationale and action for board consideration, including prompts for practical application. Here, we have laid out a summary of the key guidance areas:

1. **Leadership for Improving Quality and Safety**
   This involves actively demonstrating a commitment to seeking assurance and driving improvement.
2. **Practices for Improving Quality and Safety**
   Key here is making quality and safety of care a priority of the boards business.
3. **Partnerships for Improving Quality and Safety**
   This concerns developing strong collaborative partnerships with staff and service users and the wider community.
4. **Methods for Improving Quality and Safety**
   The crucial focus here is to support the provider in applying a quality improvement methodology.
5. **Measurement for Improving Quality and Safety**
   This involves selecting board measures to monitor and demonstrate an improvement in the delivery of care.

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6. **Risk Management and Assurance**
   Here, it is important to ensure that all risks to service user quality and safety are addressed in a robust and structured way.
7. **Planning for Improving Quality and Safety**
   The focus here is on championing and overseeing the development, implementation and monitoring of a plan for improving quality and safety.

"BY PUTTING A FOCUS ON QUALITY AND SAFETY, HEALTHCARE ORGANISATIONS CAN MAKE AN INSTITUTIONAL CHANGE, LEADING TO NATIONWIDE, INTERNATIONAL CHANGES"

This resource will assist board members to:

- Reflect on their performance and approach to improving quality and safety
- Understand leading quality improvement practices
- Make improving quality and safety a central tenet of a board's agenda
- Develop partnerships with staff and service users for improving quality and safety
- Drive improvements in care in a measurable way
- Be aware of the importance of using proven quality improvement methodologies
- Seek assurance and approve a plan for improving quality and safety.

The importance of quality and safety

In Ireland, quality in healthcare is defined by the four domains set out in the National Standards for Safer Better Healthcare (Health Information and Quality Authority, 2012). These are person-centred effective and safe care and support, better health and wellbeing, leadership, governance and management, workforce and use of resources and information. The overall goal of the HSE quality and patient safety enablement programme is underpinned by four key objectives:

- Services must subscribe to a set of clear quality standards that are based on international best practice
- Services must be safe and there must be a robust level of both quality improvement and quality assurance
- Services must be relevant to the needs of the population
- Patients must be appropriately empowered to interact with the service delivery system.

The first Irish national study of adverse events in hospitals (Rafter et al. 2016) highlights the importance of shifting the focus towards quality and safety of care. A total of 1,574 randomly selected adult inpatient records from a sample of eight hospitals stratified by region and size across the Republic of Ireland in 2009 were retrospectively reviewed. The prevalence of adverse events in admissions was 12.2 percent, with an incidence of 10.3 events per 100 admissions. Overall 70 percent of events were considered preventable. Irish adverse event prevalence is at the upper end of the range of other international studies.

By putting a focus on quality and safety in all areas, including at the board level, healthcare organisations can make an institutional change, leading to nationwide international changes.

The guidance is hosted on the HSE website and it will be updated to take account of changes in national policies and guidelines, and international best practice. The resources and recommended reading for each section are available electronically on the website. ■

KEY POINTS

- ✓ Boards have a responsibility to make improvement of care quality the organisation's top priority
- ✓ The HSE has devised a framework to help achieve this goal
- ✓ Views of an international team of board members were taking into account for the framework
- ✓ The framework comprises seven leading practices available on HSE website at hse.ie

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The art of influencing

What's behind the phenomenon?

Top influencers from the healthcare field weigh in on what it has taken to establish credibility in their niche.

Industry influencers have always existed in one shape or form but today their reach has been leveraged by social media networks.

The modern-day influencer is a person who can impact opinions and bring 'food-for-thought' topics to the forefront through the power of their blogs, LinkedIn, Twitter or via another of the myriad of online channels.

While the act of 'liking' or 'sharing' on a social media channel and growing a reputation may appear on the surface to have superficial value (it doesn't take long to press a thumbs up!), an influencer's online presence is actually a result of and developed parallel to old-fashioned graft in their field. HealthManagement.org spoke to a selection of top healthcare influencers about how they have made their names.

João Bocas

The Wearables Expert and CEO Digital Salutem

@WearablesExpert

"I believe that healthcare is very unique in its own right so to be called a top healthcare influencer is such a privilege. With that in mind, I would like to breakdown 'Healthcare' and 'Influencer' into two separate parts in order to make sure that the blend of the two words together makes sense. Starting with healthcare; does this person clearly display a deep understanding and insight of the industry by his/her involvement on a daily basis in professional terms? Is this professional trusted and seen as a credible and respected opinion leader? Is this person passionate and actively involved in making a difference to people's lives with his/her contribution? Now addressing influence, which is probably even trickier, I have to ask what's the role of the influencer? How do we dictate influence? Is this professional contributing to the shaping up of the industry by connecting people, solving problems and sharing knowledge? I could come up with many more discussion points, although in my opinion some of these questions must be asked before we can call anyone a top health influencer."

João Bocas contributes regularly to industry events, either as a keynote speaker, moderator, chair or panelist where he shares his expertise and knowledge gained over the past 20 years. As a thought leader in wearables, internet of things (IoT), digital health and healthcare innovation, João explores the intersection of technology in modelling business models and shaping consumer behaviour. He is a Top 100 global digital health influencer, a foremost technology award programme that highlights bright lights in healthtech industries.

"To be selected as a top influencer, you need to forget what it is like to feel comfortable; remain extremely curious about the future, be ready to make mistakes and never share Coelho-like quotes like this…"

Bertalan Mesko, MD, PhD is a speaker, researcher and author. As a physician, he has a PhD in genomics and his books on the digital health sphere have earned him the status of an Amazon Top 100 author. More than 3 million readers follow his blog and he is one of LinkedIn's Top Voices – an accolade recognising those who have "gotten the professional world talking".

Bertalan Mesko

Director, The Medical Futurist Institute

@Berci

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Marie Ennis-O'Connor

Founder - Health Care Social Media

@JBBC

"Becoming a healthcare influencer doesn't happen overnight; it takes commitment, hard work, and above all a passion for wanting to improve healthcare communication. You build influence from the ground up by speaking at key events, getting featured in industry publications, and creating a strong visible presence online. Be authentic, friendly and helpful, and consistently provide content that is highly relevant and valuable to your audience and you will cement your influencer status."

One of Health IT's Top 100 global social media influencers in 2017, Marie Ennis O'Connor is a digital communications strategist and internationally-recognised keynote speaker, who specialises in providing consultancy and training services to healthcare organisations. She is on a panel of multi-sectoral experts in Path To Zero, the Economist Intelligence Unit's research, policy, and advocacy initiative that aims to surface innovative strategies to support the elimination of the Hepatitis C virus. She also serves as an external international board member of the Mayo Clinic Center for Social Media, and sits on the board of the Patient Empowerment Foundation.

Ian Weissman

Radiologist - Milwaukee Veterans Affairs Medical Center Milwaukee

@DrIanWeissman

"I really do not believe that there are 'top healthcare influencers'. I am always learning from every individual who shares their ideas and views on social media. The strength of this medium is that it is a team effort. What I try to do is to comment on or share articles about issues that I feel very strongly about. I believe in the power of the healthcare community across the world, and I believe that together we are producing positive change. I would encourage anyone who believes strongly in an issue to get involved. Your voice matters."

Radiologist Ian Weissman is a strong patient care advocate who believes in using innovation and leadership best practices to improve the patient experience. He is the first radiologist in the United States to earn the prestigious title of Leadership Mastery through the American College of Radiology's landmark Radiology Leadership Institute. Dr. Weissman strongly believes in collaboration, and is an active participant on Twitter, named, in spite of his above modesty, by multi-million member CompassPHS as one of the "10 fantastic physicians to follow."

Rafael Vidal

Cardiologist, Hospital Universitario Lucus Augusti & Former Nucleus ESC Cardiologists of Tomorrow European Society of Cardiology

@rafavidalperez

"You need to be open minded and it´s essential that you share health content of quality and interest for a big audience. One key element to be an influencer is to be in the most important congresses to give a live coverage of these events, providing useful knowledge and essential information."

Rafael Vidal is a clinical cardiologist specialising in cardiac imaging and acute cardiac care. As well as being active in cardiac training through membership of education committees, he is also passionate about clinical research, cardiology specialist training and application of new technologies in health. He has appeared in the top ten influencers list of healthcare social media analytics company, Symplur.

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Click, like, retweet: healthcare reputation online

Making social media work for your organisation

Leading healthcare social media expert gives rundown on how online presence should not be left to chance.

Marie Ennis-O'Connor
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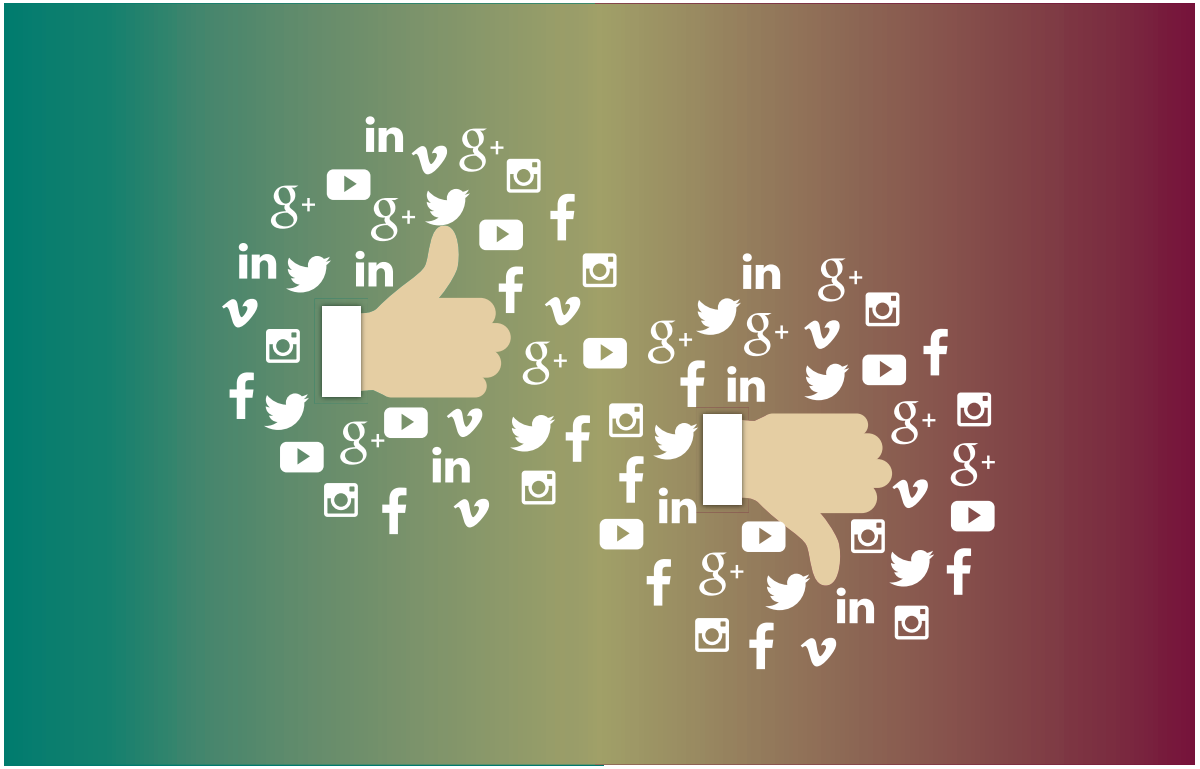
hcsmmonitor.com



Social media has an increasingly important role to play in maintaining an organisation's reputation and image. Not only are patients seeking health information online, many say their choice of a specific doctor, hospital or medical treatment is influenced by social media. Patients are also using social media to vocalise how they feel about their doctors, drugs, treatment plans, insurance, and medical devices.

Don't think if you are not on social media, patients aren't discussing your organisation. You can't opt out of reputation management - whether you have a social media presence or not, a patient who has a bad experience with your organisation is only one tweet or Facebook post away from sharing it with the world.

It is far better to take control of your reputation by responding to these conversations yourself and correcting any misinformation or misperceptions. Responding in real time strengthens public perception that your focus is firmly on patient satisfaction. Remember that everything you do online - every blog post, every tweet, every conversation - is a reflection of your brand. A successful social media presence hinges on the trust between you and your followers. Becoming a trusted source of health information for your patients and proactively developing a strong, consistent, and credible image online will increase patient trust and confidence in your organisation.

Trends in healthcare social media marketing

There are many exciting trends on the horizon; for the sake of brevity, I'll focus on just three of them. Firstly, Chatbots and Artificial Intelligence (AI) will play a much bigger role in automated marketing, much of it via social media. Secondly, the way people search for information online is changing. Increasingly, people

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are using voice search on their smartphones, tablets or voice assistants to search for information on the Internet. It is predicted by 2020, 50 percent of all searches will likely be voice searches, so marketers will need to start optimising their content for voice search. Thirdly, we've been hearing a lot about the importance of video marketing and this trend will continue to grow in importance. By 2020, Cisco predicts that video will make up 80 percent of the content we consume online.

As an extension of this, live video streaming is an important component of social media marketing. People are spending three times longer watching live content than pre-recorded videos. Marketing is now less about pre-produced, scripted videos, and more about delivering an authentic experience that people can connect with. Healthcare organisations should leverage the power of live video to communicate their story and build relationships with their patients.

Not only is social media marketing and healthcare a natural fit, it's a necessary one. More people use social media than ever and this spans all age demographics. As the Internet increasingly becomes the medium of choice for researching health information, social media has become an important channel for attracting new patients and improving the patient experience. 80 percent of internet users search for health information, and 40 percent of those are looking for a specific doctor or healthcare professional. And with a generation of millennials who are more likely to seek initial medical advice from the Internet, it follows that the best way to reach patients is to meet them on their online journey. It's crucial that healthcare organisations evolve their practices to meet this growing demand.

Putting time and effort into using social media makes sense in light of these facts, and yet many healthcare organisations are still hesitant to embrace social media. There are several reasons for this, including failure to see the value of social media, concerns about the risk to patient privacy, and perceived lack of time to create content and maintain a social media presence. While I understand these objections, I point to the many healthcare organisations that have successfully integrated social media into their marketing channels, while still maintaining patient and data privacy. And when it comes to finding time for social media, there are many time-saving tips, tools, and strategies which I teach clients to help them manage their time better.

Action plan

The one thing I see time and again is that organisations jump on board with social media without a plan. They have no clear idea why they are using social media, beyond the reasoning that "everyone is on social media" so they should be too. They don't really know who their audience is, so they may be on the wrong social media platform to reach them. And if they haven't researched their audience, how will they know which kind of content to post which will be of most interest to their patients?

To make social media an effective means to reach patients you need to take a more strategic approach. When working with clients, the first thing I do is develop a solid social media plan to move their strategy in the right direction. I also advise clients to never forget that social media is a conversation – you need to listen and respond twice as much as you talk. Many organisations make the mistake of using social media as a one-way broadcasting channel. Organisations need to commit to listening, genuinely responding, and engaging with those people who take the time to interact with them online.

I'm excited when I see organisations who are creative in their use of social media. A recent campaign which stands out for me is "Know Your Lemons". Through an eye-catching and highly visual graphic Worldwide Breast Cancer delivered critical information about lesser-known warning signs of breast cancer. Movember is another stand-out campaign which encourages men to grow moustaches in the month of November to raise awareness of men's health issues. It started in Australia and New Zealand in 2004 and has since become a globally successful fundraising campaign.

Marketing mix

Realising social media's potential in healthcare requires an organisational culture that values social media as central to its overall strategy. Social media should be viewed not as an add-on, but as an essential component of healthcare marketing. Unlike traditional marketing practices that have stayed constant for decades, social media is still a relatively new marketing channel with new networks, updates, and features constantly emerging. Marketing departments need to invest more of their budget in platforms and resources that takes full advantage of the opportunities presented by social media.

Both traditional and digital marketing should draw on each other's strengths and complement each other. Social media creates direct communication with an audience in a way that traditional marketing cannot do. Where social media can be highly targeted and measurable, traditional marketing tends to throw information out there, and hope it sticks. The strength of traditional marketing is in its integrated,

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multi-channel approach, something that I see missing in many social media campaigns. Both traditional and digital marketing channels should be better aligned, for example using print or broadcast media with a call to action to an online initiative. Traditional marketing also tends to attract a larger budget, which digital third need to get better at claiming for their social media initiatives.

Winning strategy

Creating and maintaining your online reputation is a proactive effort. You build an online presence from the ground up. Start by optimising your website - think of it as your home-base to which you will be directing your social media followers to find relevant and engaging information. With more people accessing the Internet via mobile devices, make sure your site is optimised for mobile viewing. To increase the likelihood that your website will be placed at the top of Google search results, thereby earning you trust with your audience, consider adding a blog to your site. A blog serves to proactively show your patients that you are a trusted source of healthcare information.

Next, put a content promotion plan in place. In today's noisy social media world, you need to amplify your content to be heard. This can be done through a combination of paid promotion and organically through influencers and employees. Make it easy for people to share your site's content on social media by incorporating social share icons prominently throughout your website. Create lots of visual content such as infographics and videos and encourage people to share these on social media. Post updates about your hospital's accomplishments, showcasing ground-breaking surgeries, cutting-edge research, and the work of high-profile staff members. Cross promote each piece of content you create, but do not copy and paste the same post on each platform—format each of them to meet the requirements of the specific platforms. At the end of each week, take time to monitor and measure the impact of your social media activity. Monitor your engagement rates and pages views to see which channels get the most attention and measure the return on investment for paid ads and social media promotions.

Successful case studies

Mayo Clinic leads the way in their use of social media in healthcare marketing. By establishing the Mayo Clinic Center for Social Media (MCSMN), Mayo has taken firm control of its digital reputation. MCSMN is a perfect example of a healthcare organisation getting executive buy-in on social media and putting its marketing budget towards cultivating a strong social media presence. Interacting on social media should always be about creating connections and building engagement. Mayo's Sharing Mayo Clinic blog is a good example of creating a digital platform for patients, families and Mayo Clinic staff to share their collective experience.

Social media's influence has still not reached its peak; it will continue to disrupt healthcare in ways we are only beginning to understand. It is equally important nowadays for healthcare organisations to communicate with patients online as it is through more traditional offline channels. Knowing how to leverage this opportunity is an essential skill for the modern healthcare organisation. I like to use a quote from Erik Qualman: "We do not have a choice on whether we do social media, the question is – how well we do it".

The best social media accounts are precisely targeted, updated frequently, and foster an ongoing dialogue with followers. That's why it's so important to have a plan in place at the outset and monitor, measure, and adjust your progress as you go. Social media is a journey, not a destination. The continually-evolving landscape challenges us to keep up with trends and be ever-more creative in capturing the attention of audiences - that's what I find to be equally the most challenging and exciting thing about social media. There are no shortcuts to success – social media won't work if you don't put the work in – but the rewards for those of us who do are hugely satisfying and I cannot imagine any marketing success without it. ■

KEY POINTS

- ✓ Social media channels are critical for developing and maintaining healthcare reputation
- ✓ Investment in social media is necessary but many healthcare organisations are reluctant to follow through owing to privacy concerns
- ✓ Numerous healthcare organisations make a success of social media marketing while managing patient privacy successfully
- ✓ The future holds huge development for social media engagement and therefore reputation leverage
- ✓ Devising a social media plan is crucial
- ✓ Top social media accounts have clear targets, frequent updates and engage with the community

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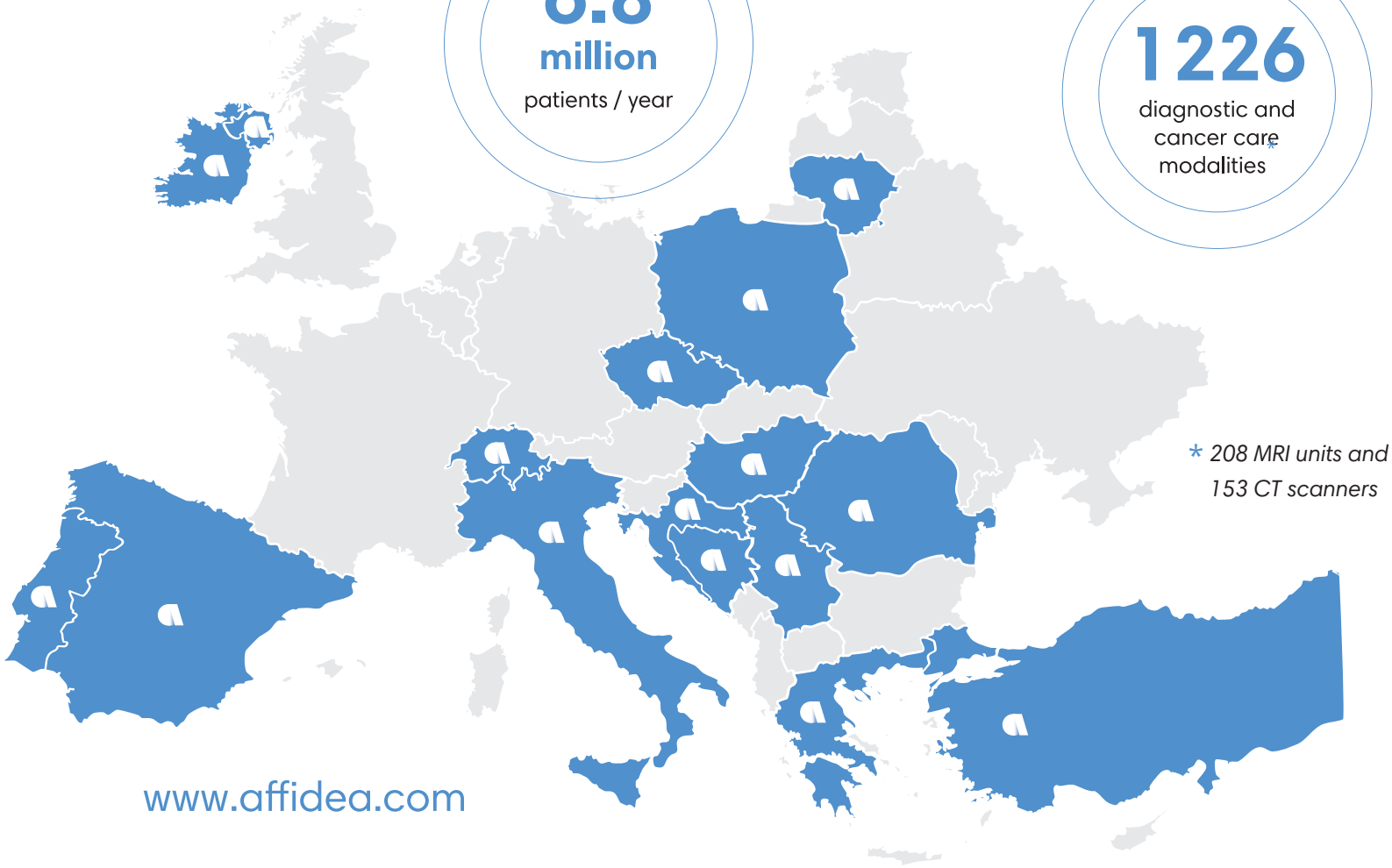

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Social media in healthcare

Opportunities and challenges

Tips and pointers from FutureLearn trainer on optimal use of social media for crisis management, patient engagement and preventive healthcare.

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How important is it that healthcare engages in social media practice? What about social media is most challenging for healthcare organisations?

In this era of information and communication technology, every sector is taking advantage of social media, and the healthcare sector is no exception. We not only obtain information via websites, but we also interact through various social media platforms. Any organisation, such as a hospital, that aims to be in the public domain, has to use social media. Healthcare has now become patient-centred which makes patient engagement and satisfaction a top priority, hence the need to implement a social media strategy. Hospitals need social media experts—a new emerging opportunity as well as a public relations department. Employing a social media expert has become one of the necessities for many healthcare organisations.

In your FutureLearn training you cover health communication crises. How should a healthcare organisation approach crisis management with online tools? How does it differ from the approach with offline tools if at all?

In our FutureLearn course Social Media in Healthcare we look at how a hospital / healthcare organisation or healthcare authority would communicate with the mass population during the outbreak of diseases and disasters, for example SARS, Ebola, the common cold, an attack by biological warfare etc. Online tools can aid crisis management through patient engagement, education, empowerment and providing the right information, which can be carried out via social media platforms such as Twitter, Facebook and health-maps, to get information out instantly. This also enables health organisations to get the latest population insights, with regards to their own health concerns. Offline tools are more about direct implementation, treatment and other traditional strategies.

Can social media enhance healthcare crisis management or be potentially damaging?

It's important to understand that social media has the potential to be both enhancing and damaging, during or after a crisis. There will be numerous rumours and misinformation spreading during a

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crisis, creating panic among the public, with the aim of making the information 'go viral.' Population education or empowerment is important to ensure that the general population doesn't fall victim to such rumours. Healthcare organisations have a duty to prevent damage in this way, by creating awareness. People should be educated to distinguish between trustworthy and misleading information. For example, we published an article on how misleading information on anorexia is promoted on YouTube, stating that "the illiterate in this ICT era will not be those who cannot read and write, but those who cannot distinguish between trustworthy and misleading information available online" (Syed-Abdul et al. 2013).

"EMPLOYING OR HIRING A SOCIAL MEDIA EXPERT HAS BECOME ONE OF THE NECESSITIES FOR MANY HEALTHCARE ORGANISATIONS"

What examples are there of healthcare organisations using online channels optimally (or poorly) in crisis management?

There are several healthcare organisations that use online channels during crisis management, such as the U.S. Centers for Disease Control and Prevention (CDC) and the World Health Organization (WHO), the Healthcare Board etc. For example, the CDC through its Facebook page (facebook.com/CDC) gives real-time information on crisis management, as well as prevention of ongoing epidemics and communicable diseases such as during the Ebola virus, Zika virus and dengue outbreaks. The Healthcare Board also offers a platform for discussions on health and healthcare transformation through its Facebook page.

However, poor use of online channels can lead to the population falling victim to misleading information. One such example and more information on the public health crisis during the Ebola outbreak is described by Basch et al., who looked at coverage on YouTube (Basch et al. 2015).

Your FutureLearn course covers Google trends, HealthMap, PatientsLikeMe, mobile apps, social-generated big data, research challenges and opportunities and gamification. How are these important for healthcare?

- Google trends are an essential tool to know about the insights of online search behaviour in relation to healthcare. Google is a first point of call for searching online for information for any purpose, and is free, reliable and widely used by the general public; this can be used to monitor public health concerns and disease outbreaks
- HealthMap (healthmap.org) aids tracking and monitoring of real cases about a disease from all over the world. This information is useful to track ongoing trends and status of a disease and provides future insights to work on disease prevention
- PatientsLikeMe (patientslikeme.com) is a platform where patients with similar diseases share their experiences and concerns, to eventually improve the understanding of their own disease
- Mobile apps are increasingly widely used, and are thus an important tool in healthcare for disease management, distraction, motivation and also communication with healthcare professionals
- With the wide use of mobile phones, social media networks and websites, social-media generated big data is becoming an important and valuable resource for researchers, to explore digital epidemiology and track the health status of population
- Gamification plays an important role in healthcare as it aids in distraction, engagement, motivation, as well as management in case of chronic diseases.

"IT'S IMPORTANT TO UNDERSTAND THAT SOCIAL MEDIA HAS THE POTENTIAL TO BE BOTH ENHANCING AND DAMAGING, DURING OR AFTER A CRISIS"

What are the top things that healthcare gets wrong when it comes to using social media channels?

In my understanding, 'wrong' here should be interpreted as being used inefficiently, because no healthcare organisation will spread incorrect information intentionally. The use of mobile phones has penetrated every aspect of people's lives; therefore, I don't think social media channels should be used when information is not timely or not targeted at the whole population.

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How about exceptional uses of social media for healthcare marketing?

Social media can be used efficiently in several ways as a means of healthcare marketing, using sponsored ads, sharing posts in groups or with targeted audiences at the right time. For instance, we are using sponsored ads on Facebook and Google to market our app on smoking cessation and have received a good response so far, leading to more app downloads.

What needs to change in a typical healthcare marketing department to keep up with social media opportunities?

Information shared on social media reaches millions of people at the click of a button. Therefore, social media should be used as much as possible. The efficiency of the information depends on the purpose of information, time and target audience. In my opinion, social media is undoubtedly more efficient than traditional tools such as radio, television, newspapers, etc. Public engagement, as well as awareness, is important, and can help enhance opportunities in social media.

How can traditional marketing models be incorporated into healthcare social media use?

Ensure you're reaching the right target audience with timely information, and make the information precise and easy to understand, which can be done more efficiently and more effectively by using social media.

What mix of factors make the foundation for a good social media strategy and upgrade healthcare online presence?

Hospitals should be involved in social media, consistently and by posting persistently, to attract more patient followers. Regarding social media presence, awareness through various healthcare groups, stakeholders, marketing ads, pages, tweets, etc. can be used for promoting the hospital's activity.

If a healthcare organisation asks your advice on how to approach social media, what are your top three pointers?

1. Focus on preventive care: In the case of a healthcare organisation, I would suggest creating promotional activities to attract more of their target audience on social media. Awareness of digital health literacy is relevant here, as it relates to people's ability to find useful health information, difficulties faced by web users, and how to improve e-health literacy among citizens (Atique et al. 2016).
2. Focus on patient engagement and satisfaction.
3. Use social media for creating disease-focused groups.■

Social Media in Healthcare: Opportunities and Challenges, is available on the FutureLearn social learning platform on 14th May 2018 - see https://iii.hm/h62

KEY POINTS

- ✓ Social media needs to reach the right target audience with timely information
- ✓ Information should be precise and easy to understand
- ✓ Social media should focus on preventive care, patient engagement and satisfaction and disease groups
- ✓ Social media has the potential to be both enhancing and damaging
- ✓ People should be educated to distinguish between trustworthy and misleading information available online

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Social media: getting it right in the marketing plan

Leveraging digital resources is the key to successful marketing

Reed Smith of the Social Health Institute weighs in on what healthcare can do to leverage their reputation through a sound social media and digital marketing strategy.

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You have a great deal of experience through the Social Health Institute (SHI) and other organisations you cooperate with. Do you think social media marketing and healthcare are a natural fit? In your experience, what have some of the challenges been for healthcare organisations when implementing a social media strategy?

Social media and healthcare are absolutely a natural fit. Social media by definition is about community. In healthcare community can drive healing. The idea of connecting with others who might be going through the same situation you are is why many spend hours each day looking at those little screens.

If I had to boil it down to the biggest implementation issue for organisations it would have to be holding out social media as a separate strategy. Is it a separate tactic? Sure, but we need to think about marketing as marketing. Traditional, digital, and social are all part of the larger plan and can only be maximised when used together.

Digital is becoming part of the organisation as a whole. We are seeing a real focus in information, technology and systems marketing, quality, operations, and even clinical environments. Gone are the days where an intern was running your Twitter account.

What are the top things that healthcare gets wrong when it comes to using social media channels?

I don't know that healthcare necessarily gets anything wrong, but maybe it is more about maximising the usefulness of social. I very seldom see a marketing department within hospitals that, I feel, is appropriately staffed to maximise digital. There should be a larger emphasis on reputation management, community management and leveraging advocates. We have to understand that consumerism has fully made its way into healthcare delivery.

"TRADITIONAL, DIGITAL, AND SOCIAL ARE ALL PART OF THE LARGER PLAN AND CAN ONLY BE MAXIMISED WHEN USED TOGETHER"

On the other hand, have you seen some ingenious use of social media for healthcare marketing?

Live video and chatbots come to mind when you start thinking about who is on the cutting edge.

Chatbots within platforms like Facebook and live video in Facebook, Twitter, and other platforms allow for consumers to better engage with the provider and consume content that is relevant and timely. With that said we have to be careful not to always be jumping to the new shiny object. Be sure you understand who your audience is and where they participate online. This can change by service offering or even location.

Do you think anything needs to change in a typical healthcare marketing department to keep up to speed with the opportunities presented by social media?

I think we are still a little overstaffed with older skill sets. It is important to understand what is coming and what the consumer is expecting. So, when you look social and how artificial intelligence and augmented reality/virtual reality are coming on the scene for example it would be important to have skill sets that complement where the industry is headed.

I would encourage every marketing department to invest in skills that maximise data and technology.

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What key characteristics of traditional marketing should healthcare bring into its social media initiatives?

All of it. I don't think we should shy away from traditional marketing efforts, strategies, and tactics. As a matter of fact, the best thing you can do is couple all your digital and traditional efforts together to have a larger and longer lasting impact.

Specifically, one thing that comes to mind is audience segmentation. These skills work well with persona development in the digital space and you look to target and re-target consumers on social.

What can a hospital do to upgrade its social media presence? What mix of factors make a good strategy?

At the risk of sounding like a broken record I would not have a social strategy. I would have a marketing strategy that includes social and other things. With that said when looking at social it is important to have a strong content plan coupled with the right frequency. Video is hard to overlook. Be sure to explore all types of video. The traditional videos we have done are great but also look at animation, and even animated gifs.

Simply put, invest in a social presence that shows your community that you really want to connect with them online.

Do you have any mini case studies on how an aspect of a hospital or healthcare organisation's marketing was enhanced by social media?

One that comes to mind is a campaign that one of my partners, Bobby Rettew, created and led for the South Carolina Hospital Association. It is called "Be Something Amazing." It is an Instagram-focused campaign to engage teens and millennials around choosing a career in healthcare. It is filled with amazing content and engaging animations. You can check it out at **besomethingamazing.com**.

It is a smart effort that takes into account the audience and where they participate.

"INVEST IN A SOCIAL PRESENCE THAT SHOWS YOUR COMMUNITY YOU WANT TO CONNECT WITH THEM"

What role does social media marketing have to play in the overall reputation and image of a healthcare organisation?

I don't think it is a surprise that the clinical leaders of our industry are also the ones leading in the digital and social space. Your brand is not just a logo, it is the experiences consumers have with coming in touch with your organisation. The experience of healthcare now moves far past the brick and mortar of our institutions and plays out everyday on social media.

Word of mouth is still the number one influencer of consumer choice but past that consumers pull from experiences of others "like" them. Social media is where they find the others. ■

KEY POINTS

- ✓ Social media and healthcare go hand in hand
- ✓ Social media should be included in a marketing plan rather than approached separately
- ✓ Hospitals need to staff modern marketing departments with more digital expertise
- ✓ Traditional marketing works well in a digital mix
- ✓ Word of mouth is prime consumer choice driver; social media plays key role in reputation building

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The ripple effect: sustainability in healthcare

How 'corporate responsibility' is impacting on healthcare

Developed by Sussex Community NHS Foundation Trust (SCFT) Care Without Carbon (CWC) is an award-winning healthcare sustainability model, which has impacted positively on reputation.

Will Clark
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Sustainability in healthcare

"Sustainability" is a phrase that's used a lot in the National Health Service (NHS) at the moment, with people interpreting it in different ways. For many it's simply about money and has become shorthand for doing more with less. This is understandable since it is no secret that budgets are shrinking, demand is rising, and interventions are becoming more expensive. At the same time others equate the word with having an environment conscience or being eco-friendly, which is also reasonable as it's an issue that's increasingly in the public eye.

These are narrow interpretations and in reality understanding the concept of sustainability requires a more holistic perspective. It is now widely accepted that for an organisation to be truly sustainable its business model needs to account for and add value to three interrelated capitals: economic capital (the long term economic value of the organisation and its investment practices); environmental capital (in terms of the resources it consumes and the emissions and waste products it produces) and; social capital (the relationship between the organisation and people – i.e. its staff, the community and people working within the supply chain). This idea has become known as the "triple bottom line" approach to business and one that is reflected in NHS policy on sustainability (Sustainable Development Unit 2018), supported by statutory legislation such as The Public Services (Social Value) Act (The National Archives 2012), and all NHS providers are expected to put in place Board approved Sustainable Development Management Plans (SDMPs) intended to implement these policies. However, in reality most SDMPs that I have read tend to focus primarily on the environmental aspects and financial aspects. Seldom do they articulate a vision for delivering sustainable healthcare that reflects this broader interpretation and gets closer to the core business of the organisation. I think there are several reasons for this including increasing UK and European Union regulation and related statutory drivers and the high management cost of environmental impacts. Additionally, it is relatively straightforward to measure environmental impact inefficiencies and most providers lack the expertise, resources and skills to develop more comprehensive, integrated corporate social responsibility programmes. Finally, there are ever increasing levels of environmental awareness within society with a growing expectation that large organisations adopt a positive and meaningful attitude to environmental management – particularly those spending taxpayers' money.

Resource challenges and triple bottom line

In light of this it's perhaps unsurprising that most sustainability strategies in the NHS are really just environmental management or carbon management plans. However, this is exactly how Care Without Carbon's (CWC: www.carewithoutcarbon.org) predecessor strategy started life. Called "15 by 15" the strategy aimed to reduce the Trust's main environmental impacts by 15 percent between 2010 and 2015. The strategy was very effective, achieving most of these objectives two years early.

> "THE REPUTATION OF ANY ORGANISATION IS SHAPED BY MORE THAN DELIVERY OF THE CORE SERVICE IT PROVIDES"

CWC was conceived in response to a challenge from the Trust's Board: how do we make this agenda more ambitious and meaningful, accelerate the pace of change, embed this programme further into the Trust and make it part of our core business?

To address these points, particularly the last one, we needed to articulate the triple bottom line message in a way that would be more clearly

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understood by an NHS Board. Our starting point is to be clear that sustainability is simply another way of saying "resource efficiency". And if you look at the NHS through the triple bottom line lens you can identify three major resource challenges:

- Dealing with a £30b shortfall in funding to 2020
- Tackling the largest carbon footprint of any public sector organisation in the UK
- Maintaining the health, wellbeing and productivity of its 1.3m staff.

CWC enables NHS providers to address these challenges through their sustainability work in a systematic and integrated way. This is, in a nutshell, what we believe makes CWC more mature than most sustainability initiatives in the NHS.

Sustainability and reputation

The reputation of any organisation is shaped by more than delivery of the core service it provides. Corporate social responsibility is now a major consideration in the private sector, and the NHS is no exception. In demonstrating that we take our sustainability responsibilities seriously we are also showing that the care we provide extends to the physical environment and to the communities that we serve.

We've actually gone out and asked patients if they thought this was something that the NHS should be spending time on, with an overwhelmingly positive response; the majority of people we spoke to felt the NHS should be working to become more sustainable, even if this cost more. Our work with CWC shows our patient community and staff that we have listened to them, and taken action.

We report on our progress on CWC in different ways to ensure we're communicating the benefits to as many stakeholders as possible – through the Trust's annual report, through our stand-alone Annual Sustainability Progress Report which we now routinely publish and through our website.

Enhancing our reputation through CWC wasn't an explicit aim when we started the programme but has become increasingly important over its life. When the work started in 2010 sustainability was a very new concept in the NHS and a completely new one for SCFT. I needed to make the case for the Trust to embrace and invest in it and the Board wanted assurance that the approach I was proposing represented best practice.

"BE CLEAR WHAT YOU MEAN BY SUSTAINABILITY AND WHY THE ORGANISATION TAKES IT SERIOUSLY. MOST PEOPLE CAN SEE THROUGH "GREEN WASH""

I therefore decided to seek external recognition and in 2011 the programme was awarded the Health Service Journal's Good Corporate Citizenship award – the first of several high profile awards it has received. The 2011 award served both as confirmation that the programme was hitting a national benchmark but also gave a reputational boost to the Trust, which had only been formed the previous year. This was clearly regarded by the Board to be a tangible benefit of adopting a proactive approach to sustainability, alongside the cost savings and other outputs we were identifying and delivering.

By the time CWC was developed in 2013 it had become clear to me that sustainability was something that we needed to actively market in order to raise awareness, generate interest and encourage engagement. This was the fundamental reason for developing the brand and as recognition of CWC has grown (it is now known internationally as a leading example of sustainability best practice in healthcare) this has only served to reinforce the Trust's commitment to supporting and promoting the programme. For instance, it used CWC in its recent recruitment campaign as a means of highlighting its ethical and forward-thinking attitude as an employer.

Public demand

Our experience is that people do want to see the NHS take a positive stance in tackling climate change. There has been increasing coverage of the impact of air pollution on health for example. It does help to raise the profile of the issue in the public mind and as a response to this Trusts will have to show they are doing their bit towards solving the problem.

I WOULD SAY ALL MEDIA, NOT JUST SOCIAL MEDIA, HAS HELPED TO MAINSTREAM THIS IMPORTANT CALL TO ACTION

I would say all media, not just social media, has helped to mainstream this important call to action. What we try to demonstrate with CWC, is the link between sustainable behaviours and healthy behaviours, so people can see that our work is addressing more than one agenda (a sustainable lifestyle is a healthy lifestyle and vice versa). After all, at the end of the day we are here to help keep people healthy.

There is a growing demand across the NHS on all aspects of its services. Sustainability is not as high on that list as, say, clinical risk or quality improvement,

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but there is a risk that people will expect more than a Trust can deliver. We have to manage our services to deliver the best outcome for patients, and patient care will always be at the heart of our decision-making.

One area we want to start to tackle is the public health relationship with sustainability. For example, many of the techniques we use to engage staff in more sustainable, healthier behaviours to promote and enhance wellbeing in the workplace are equally applicable to patients and the wider community. We would like to start working with some key patient groups, for instance pre-diabetic patients – to demonstrate the impact that simple lifestyle changes can make, to their own health of course, but also in terms of environmental improvement. There are some important public health challenges that are intrinsically related to environmental quality – air pollution caused by motorised transport and respiratory disorders is a great example.

Delivering a clear message

When approaching the development of a good sustainability reputation, it's important to be very clear with your communication strategy and use language people can understand. Be clear what you mean by sustainability and why the organisation takes it seriously. Most people can see through "green wash" so the messaging needs to be sincere and consistent.

Also, use every opportunity to talk to staff, patients etc to find out what their interests are, enable them to get involved and to make suggestions.

Finally, don't overpromise and make sure you can measure and report on progress and evidence successes. Don't be afraid to talk about things that haven't gone so well or areas where you recognise you need to take more action. ■

KEY POINTS

- ✓ Sustainability is interpreted differently throughout NHS
- ✓ Understanding sustainability needs a more holistic approach
- ✓ CWC confirmed there is a growing public demand for activity that supports sustainability – especially from taxpayer-funded organisations
- ✓ CWC was directed by board to reduce main environmental impacts with an ambitious and accelerated pace while making programme part of Trust's core business
- ✓ Reputation enhancement was not aim of CWC but became an intrinsic part of initiative with the programme garnering accolades
- ✓ All media, not solely social media, have played a key role
- ✓ When it comes to delivering a message on an organisation's sustainability activity, a clear and sincere message is necessary

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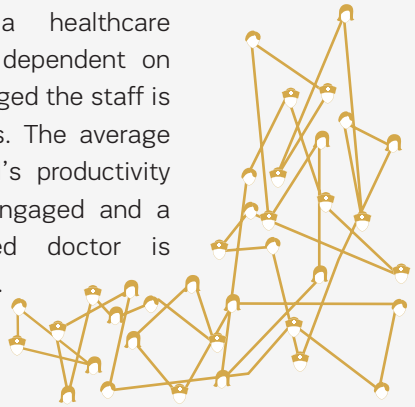
REPUTATION IN HEALTHCARE

STAFF ENGAGEMENT

The reputation of a healthcare organisation is greatly dependent on how engaged or disengaged the staff is with patients/customers. The average difference in a hospital's productivity per year between an engaged and a non-engaged/disengaged doctor is approximately $460,000.

Source: Gallup https://iii.hm/gvi



FACTORS THAT AFFECT REPUTATION

- Accurate diagnostics
- Efficient treatments
- Patient education
- Fast appointment scheduling
- Effective communication
- Short waiting times
- Use of leading-edge technology
- Collaboration between general practitioners and specialists
- Qualified and dedicated employees

Source: PwC https://iii.hm/gvk

BRAND AUTHENTICITY

Healthcare is a service industry, and that is why branding plays an integral role in enhancing the patient-hospital relationship. A strong brand increases patient trust and helps improve their perception and their overall experience with the healthcare facility.

Source: Fischer et al. (2004) https://iii.hm/gwp

KEY DIMENSIONS OF BRAND AUTHENTICITY

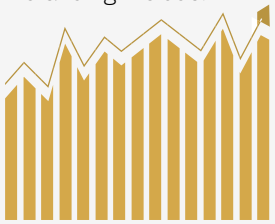
- Reputation of the healthcare team
- Personal relationships
- Systems and procedures of the healthcare organisation
- Healthcare facilities and technology
- Atmosphere of the healthcare facility
- Brand reputation
- Quality of service encounters

INVESTMENT IN BRANDING

Factors driving increased focus on branding include:

- Market consolidation
- Social media attention
- Increased scrutiny
- Increased pressure to deliver more value

Source: Keckley Report https://iii.hm/gvl



REPUTATION CHALLENGES

- Attracting new patients
- Relationship management
- International competition
- Attracting skilled healthcare professionals
- Engaged employees
- Increased transparency

HEALTHCARE-ASSOCIATED INFECTIONS & REPUTATION

- Adequate investment in methods and processes that could detect and reduce HCAI rates offers significant reputational returns for healthcare organisations
- Reputation building for healthcare facilities will require a greater focus on infection prevention and management techniques

Source: MindMetre Research Study https://iii.hm/gvm

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Quality and safety in radiology

New book to provide a roadmap for optimisation

In a soon-to-be released book, experts offer their knowledge and guidance for optimising quality and safety in radiological practice.

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Summer 2018 will see the release of a monograph edited by Prof. Lluis Donoso Bach and Prof. Giles Boland. *Quality and Safety in Imaging* provides a roadmap for optimising quality and safety within radiology practices, whether academic or private and irrespective of their national setting.

The publication also offers a round-up of all aspects of the radiology workflow, from imaging appropriateness, examination scheduling and patient preparation through to imaging protocol optimisation (including radiation dose management), modality operations, reporting (including structured reporting), and report communication.

From innovative IT tools, including clinical decision support, that drive compliance with national best practice standards and guidelines, to the use of big data tools to manage and enhance clinical delivery, all aspects of quality and safety are addressed. The contributors also introduce and explain how metrics can be designed to measure the value that radiology brings to patient care and outcomes.

In an interview with HealthManagement.org, the editors offer their insight into what readers can expect as well as their hopes for young radiologists.

What was the vision behind the book?

Issues that are related to the quality of radiological services and patient safety appear to be drawing in more interest among fellow radiologists, especially as we seem to be in today's age of "value-based healthcare".

How would you describe the content of the book to your readers?

Readers will find an update on the most relevant issues related to quality and safety, with contributors from both sides of the Atlantic providing different views on the proposed solutions.

What kind of research was carried out for the book?

We spent a lot of time researching the book, it was much more than just a specific search. The proposal of the different themes and authors who contributed has been drawn from our daily experience in our environment, and from the professional societies in which we have the privilege of collaborating.

What did you learn from the experience?

Prof. Donoso: Speaking for myself, I appreciated the opportunity I have had to learn important concepts and details that are, and will be useful, to implement in my environment. It has also reinforced to me that quality and safety in the care of our patients must be at the highest level of prioritisation within our departments.

How do you think this may impact the field of radiology?

The impact of these issues related to quality and safety are of the utmost importance at this moment. Hence it's crucial that we demonstrate our value and advanced knowledge on the concept of "value-based imaging".

What can young radiologists learn from the book and how can they improve their practice with more guidance/knowledge?

This book is of special relevance for all of the younger radiologists. Going forward they are the ones who should lead projects related to quality and safety in patient care. The future of our specialty will depend largely on our involvement in these aspects of patient care.

Quality and Safety in Imaging will be released this summer [exact date TBC] and is intended for anyone wishing to deepen their understanding of contemporary best practices regarding quality and safety. For further information visit **springer.com/de.** ■

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Diagnostic imaging in sports medicine Diagnostic imaging in sports medicine

Radiologists collaborate with sports physicians for optimal performance

How diagnostic imaging can be used in sports medicine and how different techniques can be used to assess muscle injuries.

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Diagnostic imaging in sports medicine

As muscle injuries represent more than thirty percent of sports injuries, with great implications for professional teams, musculoskeletal radiologists need to share the new knowledge of sports medicine in terms of diagnosis, prognosis and return to play in muscle injuries.

New injury classifications have been published, in order to connect the imaging findings and clinical examination and thus improve the grade of severity of muscle injuries and the possibility of re-injuries.

It is very important to get the best diagnosis after muscle injuries in order to determine the severity of the injury (in other words the time for return to play/sport/competition) and the risk of re-injury.

For this reason, cross-collaboration is of key importance between:

- Sports physicians with vast experience in muscle injuries and return to play together with expertise in ultrasound
- Musculoskeletal radiologists with a background in muscle injuries and expertise in new imaging sequences and 3 Tesla magnetic resonance imaging (MRI)

Ultrasonography and magnetic resonance imaging are currently the most frequently applied techniques in sports medicine. Imaging is crucial to confirm and assess the extent of sports-related muscle injuries and may help to guide management, which directly affects the prognosis. Prognosis based on the available clinical and imaging information is vital.

Classification of muscles injuries

Although different classification systems have been published, because they are used in daily practice, it may be challenging to classify injuries due to varying muscle architecture, lesion extension, activities when the lesion occurred and even the mechanism.

Recently three new classifications have been proposed:

1. Munich Consensus Classification (Mueller-Wohlfahrt et al. 2013)
2. British Classification System (Pollock et al. 2014)
3. FCB Barcelona and Aspetar Classification (Valle et al. 2017)

These classifications focus on different factors that are key for a best diagnosis and prognosis:

1. Mechanism of injury
2. Location of the injury
3. If myofascial, myotendinous or intramuscular tendon affected
4. If there is retraction of fibres or not
5. Extension of oedema (& cross-sectional area)
6. If it is a re-injury

These classification systems are based on the current available research and experience of clinical experts from different institutions with experience in assessing a high volume of muscle injuries.

However, we need a consensus to improve communication between all sports physicians and radiologists in athlete-related professional relationships regarding muscle injuries.

How MRI findings contribute to diagnosis and prognosis

3 Tesla MRI techniques have contributed to getting better images of the muscle architecture and muscle injuries, especially the level and quantity of myoconnective tissue. This means that the extracellular matrix involved might be variable,

based on the principle that the more connective tissue is damaged, the greater the functional impairment—and worse prognosis.

Currently we are able to read how muscle injuries affect the myoconnective tissue, myofascia, i.e. more peripheral injury, myotendinous, i.e. typical muscle injury with feather imaging as well as intramuscular tendon injury. We have clinical evidence that when an injury has affected the intramuscular tendon, such as the common biceps/semitendinosus tendon, the prognosis was far worse and the incidence rate of an injury was higher.

"MANY SPORTS MEDICINE PHYSICIANS HAVE LEARNED TO APPRECIATE HIGH-QUALITY IMAGING TO HELP GUIDE ATHLETES IN RECOVERY"

When the doctor identifies a gap or retraction of muscle fibres, it shows there is a criterion for bad prognosis—a "marker" with less scientific evidence. In practical terms this means that the severity of a muscle injury in the same location can depend on the different histoarchitecture alteration, i.e. the difference between an injury that can last weeks or needs to be prescribed surgical treatment.

Predicting return to play and re-injury risk

At least for now there is no strong evidence that a 1.5 Tesla MRI finding is useful for predicting the time to return to sports. There is evidence in the sports medicine world that normalisation of increased signal intensities on MR images is not required for a successful return to play, suggesting that functional recovery precedes structural recovery on imaging.

But our impression is that no studies have been carried out using 3 Tesla MRI, and only hamstring injuries have been studied. Perhaps in the future, MRI examinations will be more useful. Firstly, this would demonstrate that the first criterion for return to play is a positive diagnosis and everyday imaging techniques would indeed help us. Secondly, in the rehabilitation process if something occurs with an individual, we can monitor the response using both ultrasound (US) and MRI, together with monitoring of pain, flexibility, fatigue and strength.

In the future, there will no doubt be new evidence and we will be able to to focus on areas such as:

- How fibrosis in previous injury has affected the recovery process, seen on T1-weighted MRI images
- How elastography could help as a marker of flexibility
- How we can see changes in the architecture remodelling using diffusion tensor imaging
- How the healing process by T2-weighted mapping is changing in terms of recruitment of muscles

Ultrasound, at least in our experience, is good for monitoring the healing process and controlling haematoma, fibrosis, architecture repair etc. It is cheaper and more

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useful but it's certainly not the best return-to-play marker decision.

Another frequent question in our field is whether MR imaging findings allow us to predict re-injury? The answer is not for now—there is no great evidence to support the use of MR imaging findings to assess extent of injury or histoarchitecture-affected fibrosis for identifying athletes at increased risk of re-injury. However, our impression is that it will take place, but more research is needed.

Many sports medicine physicians have learned to appreciate high-quality imaging to help guide athletes in recovery processes, although the clinical evaluation itself and other tools such as GPS values, must guide the final Return to Play decision, at least at the moment.

Ultrasound imaging of muscle injuries

These days, at least in Spain, using ultrasound (US) is similar to a cardiologist using a stethoscope. We always diagnose muscle injuries with the support of ultrasound. This requires vast experience, but it is really useful and we encourage specialists from other countries to also use this tool.

In our opinion, we agree that using ultrasound is less sensitive than MR imaging, but on the other hand with US you can observe and monitor very easily. Soon the evolution of the healing process, identifying if haematoma persists, fibrosis appears and if the fibrillary architecture is remodelling in the right way, will become clear. This is naturally really useful for daily practice.

Another advantage of using ultrasound for the evaluation of healing in muscle injuries is the ability to perform a dynamic assessment before and after muscle contraction, which may or may not depict persistence of fibre disruption, after clinical management and rehabilitation. This is very important in the evaluation of

moderate to severe muscle injuries, which are the reasons why Return to Play may be delayed.

Future techniques

Advanced MR imaging techniques available for muscle assessment are not applied routinely in clinical practice. But it's true that professional medical staff are promoting and asking radiologists for new techniques for better diagnosis and prognosis.

For example:

- T2-weighted mapping may be useful from a sports medicine perspective. T2 values increase in stressed muscles and can help us know activation or changes in muscle recruitment after muscle injuries
- Diffusion tensor imaging allows diffusion quantification of anisotropic tissues and allows us to see muscle fibre direction tracking, to detect minor muscle injury and to differentiate injured muscles from normal.
- Skeletal muscle MR elastography can be used for studying the physiologic response of normal or damaged muscles. In fact, it has been found that there is a difference in the stiffness of muscles after injury.

This and more is coming and the future will most likely encompass positron-emission tomography (PET), in order to know more about functional and metabolic muscle changes and the relation to pre-and post-muscle injuries, including the recovery process. ■

KEY POINTS

- ✓ Muscle injuries represent more than thirty percent of sports injuries
- ✓ Optimal diagnosis of muscle injury determines the severity of the injury and time to return to play and risk of re-injury
- ✓ Cross-collaboration between sports physicians and musculoskletal radiologists is of key importance
- ✓ US and MRI are the most used techniques in sports medicine
- ✓ In future, T2-weighted mapping, DTI, MR elastography and PET are expected to play a greater role as more research on these is done

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GM85 is premium mobile Digital Radiography system which allows easy navigation through anywhere with its compact design. It also provides high image quality to meet the demands of today's radiologists.

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With S-Vue™, the advanced imaging engine, enhances image sharpness and clarity. SimGrid™ provides high-quality images without using a conventional grid, reducing scatter radiation effects. Also, radiographers can lower retake rates as SimGrid™ eliminates alignment errors that often occur with a conventional grid.

At this year's ECR, Samsung is displaying a lighter version of original GM85. The weight is reduced, but the functional benefits such as enhanced mobility and streamlined workflow are still retained. GM85 provides advanced patient care with diagnostic confidence through leading edge imaging technologies.

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Imaging developments in sports medicine

Advancement of technologies continues to improve diagnosis

The official doctor for the Slovenian athletics team speaks to HealthManagement.org about how emerging technologies have made a positive impact on sports medicine and resulted in more precise diagnostics.

Khalid Nasif
Doctor of osteopathy

Head of the medical department at Terme Catez, Doctor of the Slovenian athletics team

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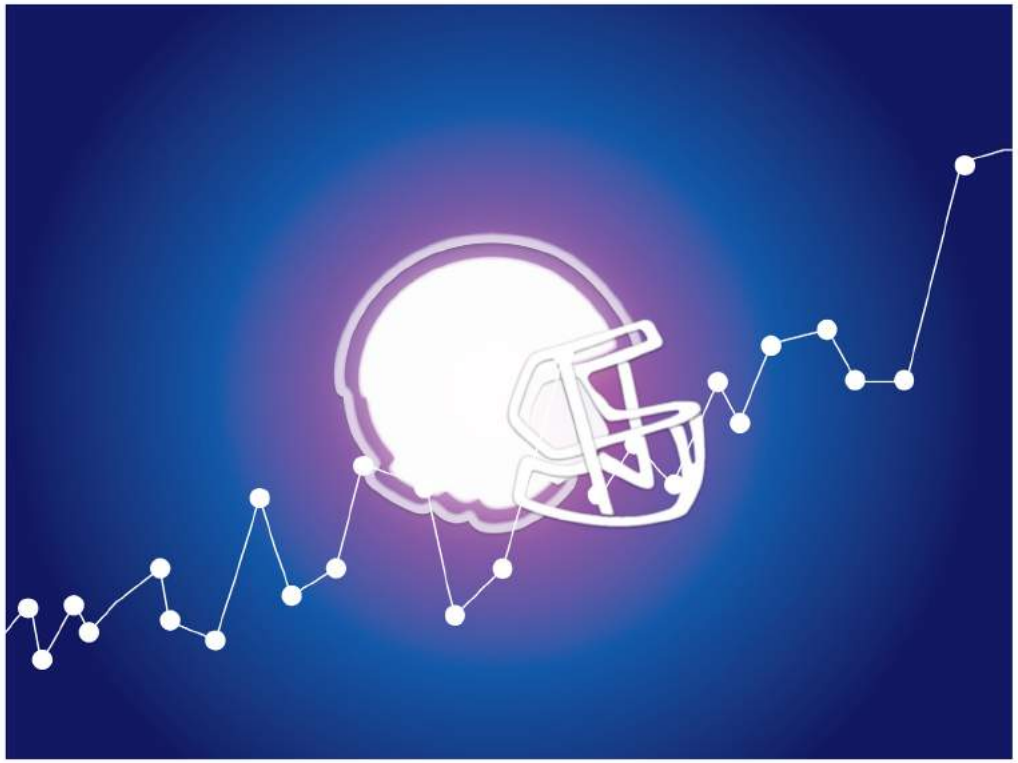

How crucial is the role of magnetic resonance imaging (MRI) in sports medicine?

In my opinion, I believe that the use of MRI imaging has been revolutionary for sports medicine as it has resulted in more precise diagnostics. The obvious advantages of being able to deliver more precise diagnostics is, of course, faster rehabilitation, and not just in sports medicine. An accurate diagnosis makes the rehabilitation simpler and quicker, because of the accurate display of the problem. As a specialist in sports medicine, I believe that magnetic resonance imaging presents a whole new revolution in sports medicine.

What do you think is the most important development in imaging relevant to the practice of sports medicine in the last 20 years?

The progress and development in this field in the last 20 years has been enormous. Imaging diagnostics has resulted in faster rehabilitation, which is indeed ground-breaking and of vast importance in sports medicine.

How has the development of ultrasound contributed to the practice of sports medicine?

I would not like to minimise the immense contribution that ultrasound has made to the field of sports medicine, however I believe that MRI has been even more significant and important. In my opinion, portable ultrasound is very significant in sports medicine. It has become part of the basic equipment during training sessions and preparations for competitions since it enables fast, direct and on the spot diagnostics. It facilitates the diagnosis especially when muscles and tendons are affected.

How MRI findings contribute to Return to Play criteria?

MRI findings significantly contribute to Return to Play criteria. I strongly advise athletes against returning to play without a prior final MRI check. Until the radiologist gives the green light that the injury has been completely rehabilitated, I cannot give my consent for the athlete's Return-to-Play.

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Are new imaging techniques on the horizon?

I believe that the advancement of technologies and the overall ever-progressing development will enable the techniques to become even more accurate and precise. I expect a significant advancement of the MRI technique in the near future.

How can they help the sports physician?

The techniques can be of great help because the accuracy of the diagnosis progresses according to the advancement of the technique which consequently means improved diagnostics and subsequently a faster return of the athlete at competitive level.

Moving the diagnostic scanning process from the radiology department to the outpatient clinic has no doubt raised concerns about safety and clinical governance. What are your thoughts on this, do you think this is something to be concerned about going forward?

In Slovenia this is not the practice. The MRI, CT and X-Rays are being performed exclusively in radiology departments in hospitals and not in outpatient clinics. This is regulated by the legislation. Outpatient clinics in Slovenia only work with ultrasounds. I personally agree with this and believe that moving the diagnostic scanning process from the radiology departments is most definitely a reason for concern.

"CORRECT DIAGNOSIS EARLY ON AND WITHIN A CERTAIN TIME-FRAME ENABLES APPROPRIATE, AND THUS A SHORTER COURSE OF TREATMENT, AND SUBSEQUENTLY A QUICKER RETURN TO PLAY FOR ATHLETES"

Is there a risk of the development of a customer-driven approach to management in which the athlete leads decisions on when and what to image?

In my opinion this is certainly something to look out for and a customer-driven approach is not the way to go. There is definitely a safety issue involved. Only professionally-trained experts with necessary training, knowledge and expertise should be able to make the decisions regarding when and what to image.

As technology develops, the ability to better understand the relationship between structure and function during athletic activity will surely improve. However, what would you say is the most important aspect of your job as it stands right now?

At the moment, the most important aspect of my job is to obtain the imaging, and subsequently, the diagnosis as quickly as possible. This shortens the duration of the rehabilitation, not just for athletes but also for other individuals. I believe that MRI imaging should be accessible for anyone who may need it. However, as mentioned previously trained experts are the ones who must decide what and when to image. Ideally, the imaging process should be done within 48 hours. This facilitates our work significantly. Correct diagnosis early on and within a certain time frame enables appropriate, and thus a shorter course of treatment, and subsequently a quicker Return to Play for athletes, or usual activities for other individuals. ■

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Point-of-care ultrasound helps save time and lives

Geert-Jan Deddens
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Time is of the essence in an emergency situation, and may be the difference between life and death. Ambulance crews on the front line must decide rapidly whether or not a patient is suffering from a life-threatening condition requiring specialist treatment, and point-of-care ultrasound can provide vital guidance. Geert-Jan Deddens, a nurse practitioner in emergency care with the Rotterdam Ambulance Service, describes the benefits of using hand-carried ultrasound systems to assess suspected abdominal aortic aneurysms, allowing patients to be taken to the most appropriate hospital immediately and avoiding delays due to onward transfer to another medical facility.

I joined the Rotterdam Ambulance Service in 2006 as an ambulance nurse, going on to train as a nurse practitioner in emergency care five years later. We look after a population in the region of 1.2 million people, covering a large area in and around the city. As a nurse practitioner, I attend emergency call-outs to provide additional support to the ambulance crews when needed, for example, in cases of cardiac arrest.

A couple of years ago, a vascular surgeon at one of Rotterdam's hospitals contacted the ambulance service to discuss the potential benefits of using point-of-care ultrasound to identify and assess patients with an abdominal aortic aneurysm (AAA) in a pre-hospital setting. Without ultrasound, we might suspect the patient has an aneurysm, but we can't be sure. This means that the hospital has to be prepared to carry out emergency surgery, with an operating theatre and emergency room staff on standby to treat this life-threatening condition, when the patient may have a completely different abdominal pathology that is less serious.

We realised that introducing ultrasound into pre-hospital care would allow us to scan the aorta in the ambulance and make a more accurate assessment of whether or not the patient has

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an aneurysm, and also to estimate its size. Once we know that, we can quickly transfer the patient to the most appropriate hospital, and provide more exact information to the surgeon much earlier. This means that the hospital is better prepared, and does not tie up resources unnecessarily. It also eliminates potentially life-threatening delays caused by avoidable transfers between hospitals, as the patient is taken to the correct medical facility first time.

At the end of 2015, we began a pilot study – Prehospital Assessment Rotterdam Aortic Aneurysm (PARA2) – to evaluate pre-hospital assessment of the abdominal aorta using point-of-care ultrasound (POCUS). FUJIFILM SonoSite provided two hand-carried ultrasound systems and, together with an emergency physician with extensive POCUS experience, trained three ambulance nurses and two nurse practitioners to scan the abdominal aorta. It quickly became part of our daily routine to scan patients' aortas, gaining as much practice as possible. As nurse practitioners, we also received more advanced training in point-of-care ultrasound, including Extended Focused Assessment with Sonography for Trauma (eFAST), to allow additional conditions to be triaged.

"THIS ALL HELPS TO MAKE SURE THAT THE PATIENT IS DIRECTED TO THE RIGHT FACILITY FIRST TIME"

During the pilot study, we scanned as many patients as possible, evaluating how easy it was to perform the procedure and the length of time it took to obtain a good view of the aorta. We carried out 950 abdominal scans during the first 16 months, finding 14 patients with an AAA where the aorta measured more than 3 cm. Of these, four patients were immediately directed to a vascular surgery team for urgent treatment, potentially saving their lives. At the same time, we were able to identify other life-threatening conditions pre-hospital, for example, differentiating between wet and dry lung problems, looking for blood in the abdomen following an accident, as well as using ultrasound during a cardiac arrest. This all helps to make sure that the patient is directed to the right facility first time, whether that is a specialist trauma or cardiac centre, ensuring that they receive the most appropriate treatment at the earliest possible opportunity. For patients with an acute AAA, this may well be a life saver. ■

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The payer determines, but it is not the patient

In healthcare patients are not consumers with the economic power they have in other markets, but the arguments for patient involvement are compelling.

"Healthcare is like dog food business". Here we hear an American explaining that in healthcare, just like in buying dog food, the consumer is not the one who determines what is on the menu, nor the one who pays. Patients are not consumers in the sense of a normal market. There consumers decide what products they buy and they determine the price through supply and demand. Dogs have to eat what their masters buy.

In many cases patients have little or no say in what treatments with medicines they get. Citizens are the ones that pay, through government taxes and healthcare insurance premiums. A citizen differs fundamentally from a patient. I hear many people say: "Eventually we all become patients". That is true, but the moment you decide something determines your thinking and decision. As a healthy citizen people think differently about a treatment than when they are patients. For me as a cancer patient it is important to be there when my first grandchild is born. When your life comes towards an end, three months can make the difference. For a citizen who thinks economically living three months longer and paying €100,000 for that is a curious and very expensive decision. Economists work with a 'quality adjusted life year' (QALY). For patients, a QALY may be a big offence. The value of a life must not be expressed in euros. However, this is the consequence of a healthcare system that starts from a market without paying consumers (patients). Then the payer determines and this is not the patient.

Why are there so many discussions about the prices of medicines? In the last few years they have been vehement, because for the first time we see that patients do not have access to medicines because of their price. And this happens without patients realising it. In the discussions and problems we come across it is important to realise that patients are not involved in the process of decision making when a medicine is ready to be used. Nor in the question of what medicine has to be developed. Nor in designing the trial to test it. Nor in determining the group on which it has to be tested. Nor in the question for which tumour it has to be used. Nor in the decision on whether it will be reimbursed. They are all moments when the patient is very important and is not involved, while the larger part of the research is realised through the use of the vital data of the patient him or herself. Instead of patients getting a reward for this in the form of accessible medicines those medicines are getting less accessible.

It is also essential in treatments that patients' data are registered and made available for research by universities and industry. This has to be implemented or continued. Patients want this. They are our data and it is not justified that politicians and lawyers fill this in differently. In this way, they block the solution for us and we die. This is not their intention, but definitely a consequence of their action. Patients and patient organsations should apply themselves on this much more and make data available for research. In this case too the patient has to determine and not, like in the dog food business, the payer.

"IF THE PATIENT IS VERY IMPORTANT AND IS NOT ASKED TO PARTICIPATE, ISN'T IT ABOUT TIME TO CHANGE THIS?"

Until a short time ago the quality of most cancer medicines was low (exceptions are blood cancers and testicular cancer). A life extension of three months was quite an achievement. As mentioned before, in individual cases this may be longer and meaningful. Primarily, however, patients want treatments that lengthen their lives till they are 87, and what is more important they want a product that improves the quality of life seriously. These are two conditions for patients to find a medicine with added value.

After years of being neglected immunotherapy seems to lead to a breakthrough. The results for, amongst others, metastasised melanomas are spectacular. If seven years ago 100% of the cases were deadly, now 65% is cured! Hodgkin's disease moves into the direction of a 100% cure. We patients want this to be tackled with priority and together with governments we want to play an important role. Let us prevent an excellent treatment like CAR-T (where modified white blood cells are returned to the patient

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and are used to fight the tumour) from being taken hostage by the industry, after which it will be priced at €475,000. With a powerful government this is not necessary at all and we can treat everyone. Let the government focus on publicly financed trials, for then it has power and can promote competition. Innovative industry can be directed towards earlier discoveries: it can earn enough money with that. Most industries earn money with real breakthroughs and are innovative. More innovative than the medicine industry, which has shown few spectacular developments in the last few decades.

Also note that with one exception medicines have all been developed with government money. Medicines are developed via universities and biotechs and bought by the industry, e.g. successful Pembrolizumab, which was developed with Dutch money by Organon and was bought and patented by Merck. And now we have to pay a very high price for it. Patents are fateful for innovation. When are we going to realise this? When you are allowed to market a product without competition for years, you lose your interest in innovation, because money can be earned more easily by means of sales and marketing. And an industry that does not innovate developing medicines leads to patients that die when they don't have to.

If with all those questions that have to be answered, before a medicine is marketed and reimbursed, the patient is very important and is not asked to participate, isn't it about time to change this? We are not stupid and it is our data. We know much about making medicines, setting up trials, including patients, registering medicines and the accompanying reimbursement. When we are involved in the decision-making, this does not lead to inferior products that are costly. For we do not want these. It is so simple: we want lives that are long and of good quality. And good medicines are crucial for this. And if we do it well, we change the 'dog food business' into a normal market with outspoken consumers that choose what is important for them. And why wouldn't we do it well? ■

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Without a shift to a personalised breast cancer screening programme, participation rates in mammography screening may further decline.

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As I said goodbye to another Christmas season and headed to the mall and my local post office to exchange a gift with one that fits or is more apropos to my personal needs, I was reminded of my more than a decade-old desire to exchange the term ‘mammography’ screening with ‘breast cancer’ screening—after all we do not screen for mammography but screen for breast cancer. I want a breast cancer screening programme that is personalised, based on the unique risks and personal preferences of women who choose to participate in screening. Without a shift to a personalised breast cancer screening programme, participation rates in mammography screening may further decline.

In the last decade, there is increasing news about the overdiagnosis of mammography screening and its harms compared to its benefits. This month another headline greeted women across the globe about the overdiagnosis and ineffectiveness of mammography screening from a study published in the BMJ (Autier et al. 2017). The study, which analysed the mammography screening programme in the Netherlands from 1989 to 2012 concluded that the Dutch programme had little impact on the burden of reducing advanced disease, suggesting a marginal effect on mortality. Additionally, the authors concluded that half of screening detected cancers represent overdiagnosis.

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Radiologists and supporters of mammography screening are yet again tasked with counteracting the growing trend of studies in peer-reviewed journals touting the harms of mammography. Often criticising the faulty analysis of the most recent study and fiercely questioning the elaborate claims of overdiagnosis, the cheerleaders of mammography screening defend the importance of its role in finding early cancers and at the same time acknowledging an insignificant rate of overdiagnosis.

Overdiagnosis is defined as the detection of tumours at screening that might never have progressed to become symptomatic or life-threatening in the absence of screening. The challenge that currently exists is that we cannot discriminate between which cancers are progressive and potentially deadly.

"IT'S TIME FOR THE BREAST HEALTH COMMUNITY TO EXCHANGE THE TERM 'MAMMOGRAPHY' SCREENING WITH 'BREAST CANCER' SCREENING"

Since my advanced stage breast cancer diagnosis in 2004, after never missing my mammography screening, I have studied the research of mammography screening and its impact on mortality. Given my significant diagnosis and that my faithful mammography screening did not benefit me but caused me harm and still may cost me my life, I should be the least enamoured advocate of mammography screening. However, the impact of early detection by screening mammography, although not perfect, is beneficial to many women with its impact to reduce mortality from breast cancer. Coincidentally, a 2015 study from the Netherlands found that even in light of new treatments, the size of the cancer and how far it spread remains vital to surviving the disease (Saadatmand et al. 2015).

I am personally aware that mammography is not an equal opportunity technology for access to an early diagnosis for many women with dense breast tissue. When a woman's cancer is not detected at an early stage, even after faithfully participating in mammography screening, there are no refunds or returns. The benefits of early detection by mammography have failed these women. They are left with the harms of a later stage diagnosis, aggressive treatment options, quality of life issues and a greater likelihood of dying from breast cancer. In our state advocacy efforts, we still encounter physician-trade organisations that are neutral or opposed to dense breast tissue reporting legislation with the goal of initiating dialogue with healthcare providers leading to personalised screening. I have worked with women across this country, who were harmed in the worst way by dying from breast cancer, not from overdiagnosis but from underdiagnosis.

It's time for the breast health community to exchange the term 'mammography' screening with 'breast cancer' screening. While most women, unless they have a genetic mutation or are at high risk of the disease, would begin their personal screening programme with a mammogram, women with dense breast tissue could alternate in-between years with a different screening tool which fits their personal breast health needs, giving them a greater likelihood of reducing advanced cancers.

Despite decades of mammography screening, breast cancer remains one of the major causes of cancer deaths in women. Research concludes that early detection by screening reduces mortality from breast cancer by detecting cancer early, leading to a decline in the rate at which women present with late-stage breast cancer when a refund or a return has expired. ■

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The Are You Dense? Handy Patient Guide to Screening Options for Dense Breasts is available at **https://www.areyoudense.org/resources/patient-friendly-tools/handy-patient-guide-screening-options-dense-breasts**

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Point-of-care ultrasound scanners

Key purchasing considerations

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Point-of-care (POC) ultrasound refers to ultrasound exams performed by the treating clinician and other non-imaging-specialist healthcare professionals. While many types of ultrasound scanners can be purchased for POC exams—including a full-featured cart-based system costing more than $100,000—several vendors now market scanners that are specifically intended for POC applications.

In addition to user preference and image quality, the major purchasing considerations are:

- **Configuration**—The types of studies to be performed will dictate the capabilities, options, and features that will be needed.
- **Portability**—Where the scanner will be used will influence the choice of mounting options.
- **User interface complexity**—Who will be using the scanner will determine how easy it needs to be to use.

Once these issues have been addressed, buyers should perform appropriate apples-to-apples comparisons of POC scanners and negotiate pricing. End users should perform evaluations of the scanners under consideration to compare image quality, ease of use, and other factors. The goal should be to choose a scanner that will best meet your facility's current clinical needs and that is most likely to address potential future changes in use.

Configuration—What types of studies will be performed?

The specific clinical applications (ie, the types of imaging procedures the scanner will be used for) will dictate its base configuration. The configuration choices include the imaging modes available, the image display and analysis software, and the transducers. For example, a scanner configured for use in labour and delivery would need an obstetrical calculation package and a low-frequency curved linear-array transducer suitable for third-trimester pregnancies, whereas a system used for anaesthesiology applications would have software to enhance needle visualisation, plus high-frequency linear-array transducers suitable for superficial imaging.

Recognising the diversity of POC ultrasound applications, some vendors offer several versions of their systems, each designed for unique clinical specialties. These specialised configurations enhance the use of the device for the given clinical application, but may present limitations if the scanner is going to have other clinical uses. If the scanner will be used for shared services, buyers should ask vendors if it can be configured for multiple applications.

The primary modes of operation include the following:

- B-mode (brightness mode) depicts anatomy as a 2-D display and is the basic imaging mode found on all ultrasound scanners.
- M-mode (motion mode) is used to assess the motion of tissues (eg, the opening and closing of heart valves) and is primarily used for cardiac assessments.
- Doppler modes enable assessment of blood flow and are available in qualitative and quantitative versions.
- Colour-flow imaging is a qualitative means to assess blood flow and comes in two versions, colour Doppler imaging (CDI) and power Doppler imaging (PDI). CDI displays the direction of blood flow relative to the location of the transducer, whereas PDI displays the strength of the blood flow. Both these modes are routinely utilised by many clinicians who use POC ultrasound.
- Quantitative Doppler modes are used by clinicians who need to better characterise blood flow. The quantitative Doppler modes are pulsed wave (PW) and continuous wave (CW). PW allows analysis of flow at a specific depth in the B-mode image but is subject

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to some limitations—most notably its inability to measure very high flow velocities. PW is used in such disciplines as rheumatology, emergency medicine, and vascular surgery. CW is used for cardiac applications and can be used to measure higher blood-flow velocities than PW can.

- Needle-enhancement mode improves the detection and display of needles and other interventional devices and is used during interventional procedures such as needle biopsies and catheter placements. We recommend that a needle-enhancement mode be included on any scanner used in interventional procedures.

"THE GOAL SHOULD BE TO CHOOSE A SCANNER THAT WILL BEST MEET YOUR FACILITY'S CURRENT CLINICAL NEEDS AND THAT IS MOST LIKELY TO ADDRESS POTENTIAL FUTURE"

As for transducers, many types are available, and their cost can range from a few thousand dollars to more than $20,000 each. Therefore, it is important to buy only those transducers that are required to perform the services intended.

Transducer types include:

- **Flat linear array**—Primarily used to assess superficial structures (eg, the breast or thyroid) and for most vascular imaging applications.

Figure 1. POC ultrasound scanner on a wheeled cart. The cart has holders for transducers and gel bottles, plus storage bins for other accessories, creating a self-contained system that can be easily transported and positioned at the patient's bedside. Shown here is the GE Venue 50 scanner. (Image courtesy of GE)

Figure 2. POC ultrasound scanner on a wall mount in an emergency department trauma bay. The wall mount allows ready access to the scanner without requiring any floor space. Shown here is the Mindray TE7 scanner. (Image courtesy of Mindray)

- **Curved linear array**—Primarily used for obstetrical and abdominal applications.
- **Sector**—Primarily used for cardiac applications and some deep abdominal applications (eg, for bariatric patients).
- **Endocavity**—Designed to be inserted into the body. They are available in a variety of designs that include endovaginal transducers for gynaecological and early obstetrical applications, endorectal transducers for prostate applications, and transoesophageal transducers for insertion into

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Figure 3. POC ultrasound scanner on a tabletop stand. A tabletop stand allows the scanner to be placed on a horizontal surface such as a bedside table or counter during examinations. Tabletop stands may be standard equipment or optional. Shown here is the Mindray TE7 scanner. (Image courtesy of Mindray)

the oesophagus for detailed cardiac assessments. Some vendors offer endocavity transducers that can be used for both endovaginal and endorectal applications, which obviates the need to buy two individual transducers.

Portability—Where will the scanner be used?

The size and weight of POC ultrasound scanners that are not designed to be handheld can make them challenging for users to hold, while performing clinical studies. Thus, vendors offer a variety of mounting options to enhance the use of the device in different clinical settings. Listed below are common mounting options for POC scanners, as well as settings where these options may be most appropriate.

- Wheeled cart—Allows users to easily transport the scanner between patient rooms or to other locations within a facility. (See Figure 1). Wheeled carts provide a stable platform for the scanner and include transducer and gel-bottle holders and storage for accessories. A cart also provides an easy method to adjust the position of the scanner in relation to the patient during an exam. Cart-mounted POC scanners are commonly used in emergency departments, surgical suites, and critical care units. Because use of a wheeled cart creates a self-contained system with all needed components and accessories readily at hand, it may be an attractive option even for settings that don't require the scanner to be transported (eg, private physician office).
- Wall mount—Allows the scanner to be mounted to an articulating arm so that it is readily accessible for use but does not require any floor space. (See Figure 2.) Thus, a wall mount may be a useful option for settings where floor space is limited (eg, small emergency department rooms, private physician offices). Wall mounts are typically limited in terms of transducer holders or storage space, so transducers and accessories must be kept in a convenient location nearby.
- Tabletop stand—Provides a means to place the POC scanner on an existing counter or table. Tabletop stands may have transducer and gel-bottle holders but lack storage for accessories. (See Figure 3.) These stands are most appropriate for users who do not need to transport the scanner between care settings, such as those in a private physician office. Some scanners employ a kickstand or other method for keeping them upright on a table during use.

Users who frequently need to perform imaging assessments in a variety of locations within a facility should consider such aspects as battery life and the overall size of the POC system (ie, the scanner, transducers, and accessories). When the scanner is not in use, it should be kept in a location that has access to AC power receptacles to keep the scanner's battery charged. Additional care-setting considerations include device integration with existing infrastructure (e.g., connection to an electronic medical record [EMR] or picture archiving and communication system [PACS]), personnel access, and security.

"THE SIZE AND WEIGHT OF POC ULTRASOUND SCANNERS THAT ARE NOT DESIGNED TO BE HANDHELD, CAN MAKE THEM CHALLENGING FOR USERS TO HOLD WHILE PERFORMING CLINICAL STUDIES"

User interface complexity—Who will be using the scanner?

Recognising that POC ultrasound is used by individuals who have a wide range of imaging skills and experience,

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vendors have incorporated the latest technologies—including touchscreen interfaces and tablet-computer functionality—to make their systems easy to use. The ease of use of the scanner is related to its level of technical complexity (ie, the number of, and ease of access to, user-adjustable parameters) and its imaging capabilities (eg, modes of operation). POC scanners that possess fewer user-selectable imaging parameters and fewer imaging modes may be appealing to new or less experienced users; however, their simplicity has the potential to limit the types of data that can be acquired and the ability to optimise image quality.

In addition to considering the skills and experience of the end users, buyers should recognise that those skill levels will improve over time. As users' skills improve, they may want to perform more complex assessments and use the scanner for additional applications, which may require upgrades to the scanner.

Buyers should inquire about any potential limitations of the scanner in terms of the types of transducers supported, the available modes of operation and other features, and the upgradability of the device. Scanners that can be upgraded may be a better option than models that have limited upgradability: having the flexibility to add new transducers, imaging modes, or other features to an existing scanner will likely be more cost-effective than having to purchase a completely new one should clinical demands change over time.

Where practical, facilities that require multiple scanners may want to standardise on just one model or a single vendor's product line to facilitate clinician familiarity with the units and to simplify maintenance. However, we recognise that standardisation on just a single model or vendor may not be practical due to the needs of some clinical specialties.

Finalising the decision

Once the issues described above have been addressed, buyers should perform appropriate apples-to-apples comparisons of POC scanners and negotiate pricing. When pricing scanners, buyers should consider the overall configuration of the system, including the standard features, as well as the additional costs of transducers, mounting hardware, and other options. End users should perform evaluations of the scanners under consideration to compare image quality, ease of use, and other factors. The goal should be to choose a scanner that will best meet your facility's current clinical needs and that is most likely to address potential future changes in the utilisation of POC ultrasound. ■

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Connecting imaging and information in the era of AI

The 13th edition of Medical Imaging Informatics and Teleradiology (MIIT) conference to take place in Ontario, Canada

This year's exciting programme will feature talks on imaging in an EMR-centric enterprise, radiology service outreach for physician engagement, using imaging informatics in quality initiatives, artificial intelligence as well as many other trending topics in the field.

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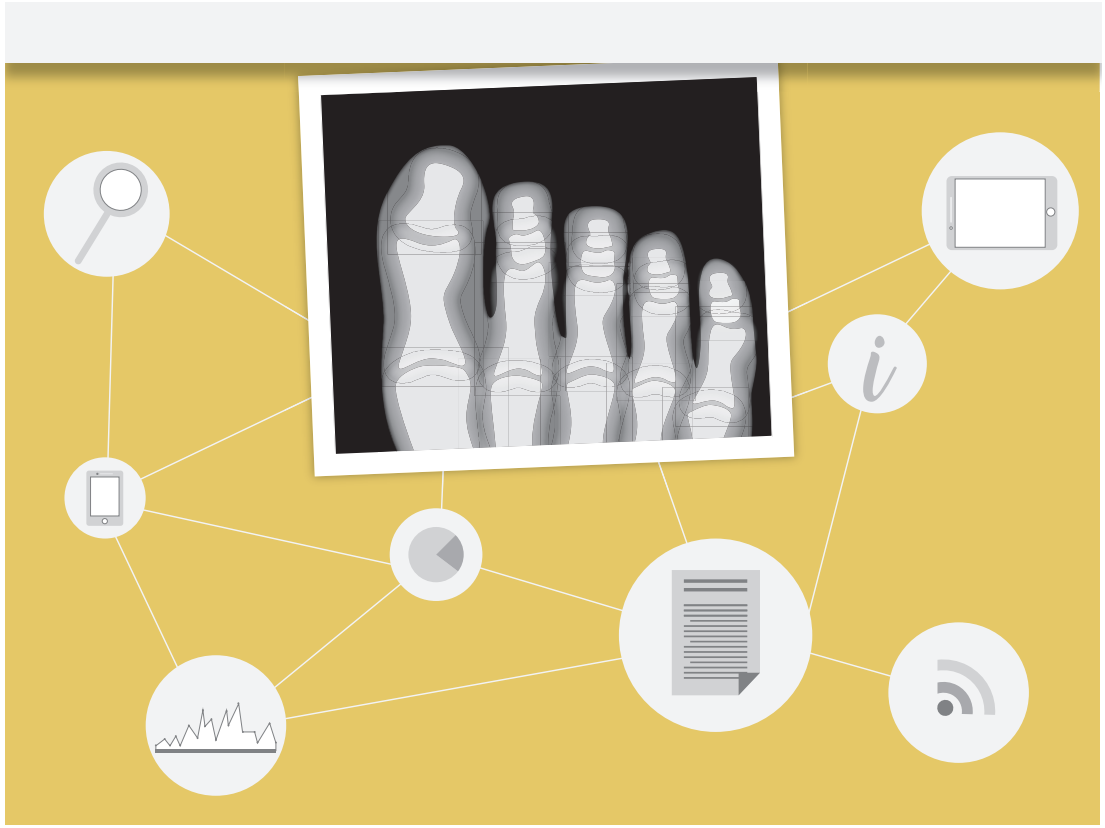

The thirteenth edition of the Medical Imaging Informatics and Teleradiology (MIIT) conference is taking place on Friday May 4, 2018 at Liuna Station in Hamilton, Ontario. MIIT focuses on emerging technologies and practices for acquiring, processing, managing, accessing, and sharing medical images, along with topics driving changes in relevant policies within Canada. Every year, MIIT brings together experienced speakers to address challenging topics in the field of medical imaging informatics.

Dr. David Koff initiated the conference when he was a radiologist at Sunnybrook Health Sciences Centre in Toronto and kept organising this conference after he took the position of Chair of the Department of Radiology at McMaster University. He is currently co-chair of the IHE International Radiology Planning Committee and director of MIIRCAM, the Medical Imaging Informatics Research Centre at McMaster University. In 2016, he joined forces with Don Dennison, a Medical Imaging Informatics Consultant and Fellow of the College of the Society for Imaging Informatics in Medicine (SIIM) to make this conference the leading imaging informatics event in Canada.

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This year's conference programme, with the theme Connecting Imaging and Information in the Era of AI, features talks on imaging in an EMR-centric enterprise, radiology service outreach for physician engagement, using Imaging Informatics in quality initiatives, and Artificial Intelligence (AI), along with an update from Canada Health Infoway (CHI) and an update on IHE.

MIIT is an opportunity to hear from an excellent group of thought-leading and engaging speakers, including Dr. Raym Geis, FACR (ACR), on the movement toward highly Automated Radiology and Dr. Matthew Hawkins (Children's Healthcare of Atlanta, Emory) on the linkage between Quality Improvements and Informatics. We also have Ms. Charlene Tomaselli (Johns Hopkins) speaking on Radiology Outreach.

"MIIT IS AN OPPORTUNITY TO HEAR FROM AN EXCELLENT GROUP OF THOUGHT-LEADING AND ENGAGING SPEAKERS"

Charlene Tomaselli, Director of Medical Information Technology at Johns Hopkins, talks about how access to, and integration of, imaging records from across systems and organisations is critical to diagnosis and care. One approach to simplifying this challenge is to have referring physician organisations place orders for their patients' imaging exams with your health system. Johns Hopkins Health System, a leading provider based in the Baltimore, MD area, has implemented an integrated, enterprise-wide EMR and imaging IT system. To further expand its network of external referring physicians and increase its outpatient exam volume, a strategic Radiology Outreach programme has been launched. In her talk, she will explore how IT systems to broker data between external and internal systems, combined with the right financial and communication strategy, can build a vibrant imaging service network that is valued by the health provider, referring physicians, and patients.

Dr. Matthew Hawkins, is a board-certified radiologist and assistant professor at the Emory School of Medicine, where he is the director of paediatric interventional radiology. He also serves as Medical Director of the Telemedicine programme, and has special interest for health policy, informatics, quality improvement, and social media – and specifically target healthcare challenges where these disciplines intersect. He chairs the ACR's Informatics Innovation Advisory Council, and the ACR's Quality Experience Committee for the Patient-and Family-Centred Care Commission. In his talk "The inextricable linkage between quality improvement and Informatics", he will explain how individuals from informatics and quality should work together.

Dr. Raym Geis, Senior Scientist at the ACR Data Science Institute, Adjunct Associate Professor of Radiology at National Jewish Health, and Clinical Assistant Professor of Radiology at the University of Colorado School of Medicine. He is a member of the Canadian Association of Radiologists' Artificial Intelligence Working Group, Vice Chair of the ACR Informatics Commission and a founding member of their Data Science Institute Advisory Group, co-organiser of the RSNA/SIIM National Imaging Informatics Curriculum and Course (NIIC), and a past Chair of the Society for Imaging Informatics in Medicine (SIIM). Dr. Geis has an MD from the University of Colorado School of Medicine, and engineering degrees from Carnegie-Mellon University and Stanford. He did residencies in Family Medicine and Radiology, and research and clinical fellowship, at the University of Colorado, and is Board Certified in radiology and neuroradiology.

For further information about the programme and speakers, visit www.miit.ca or email info@miit.ca. Don't forget to follow @MIIT_Canada and watch for #MIIT18 on Twitter. ■

KEY POINTS

- ✓ Focuses on emerging technologies and practices for acquiring, processing, managing, accessing, and sharing medical images, along with topics driving changes in relevant policies within Canada
- ✓ Popular theme of 'Connecting Imaging and Information in the Era of AI'
- ✓ Engaging talks on imaging in an EMR-centric enterprise, radiology service outreach for physician engagement, using imaging informatics in quality initiatives, artificial intelligence
- ✓ Brings together experienced and well-known speakers to address challenging topics in the field of medical imaging informatics
- ✓ Provides unique opportunity to approach the experts and find answers to questions and issues
- ✓ Targeted to an audience of professionals and students in engineering and computer sciences, health informatics (PACS Managers, DI Managers, IT Professionals, CIO/CTOs), healthcare provider (Radiologists, Technologists, Physicians), and industry roles

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Electronic clinical handover

A simple solution to a complex problem

Implementing electronic clinical handover in a hospital for better patient safety

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Clinical handover: defining the problem

Clinical handover is defined as inter-clinician communication occurring at care interfaces.

This usually refers to changes of shift within a clinical team. In essence, clinical handover is the transfer of professional responsibility and accountability for some or all aspects of a patient's care to another person or professional group on a temporary or permanent basis (British Medical Association 2004; Royal College of Physicians 2011).

With the decrease in hours worked in modern medical practice, the number of handovers performed has increased proportionally. This has raised concerns about continuity of care and the potential for patient safety to be compromised. Indeed, clinical handover has been identified as a major preventable cause of harm (Royal College of Physicians 2011; WHO 2007). In root cause analyses of sentinel events, communication is repeatedly identified as an area of concern. In almost 66 percent of cases, communication is identified as the root cause, or a key cause of the adverse event (Joint Commission 2007). Ineffective clinical handover has been shown to increase the risk of preventable adverse events, length of stay and rate of complications.

A simple solution?

Given these issues, there has been significant interest in promoting effective handover amongst healthcare professionals. Despite numerous clinical policies relating to handover, formal handover strategies are often lacking in clinical practice. For example, prior to our study, clinical handover was performed via non-standardised informal mechanisms in our institution. This could involve phone calls, handwritten information or verbal handover. This system was vulnerable to errors and had the potential to compromise patient care. We sought to introduce a reliable, standardised, reproducible method of communicating information regarding inpatients within our medical department, and to subsequently analyse the clinical outcomes and physician attitudes associated with this.

Implementing change

An electronic clinical handover project was piloted within our medical department. The pilot concept and protocol was discussed and agreed upon by the Medical Department, General Manager and Clinical Director. All staff were informed of the clinical

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handover pilot by email and at a departmental meeting. In addition, in order to achieve 'buy in' a talk was delivered to all medical department doctors on the evidence base for clinical handover in the healthcare setting and the proposed clinical handover pilot.

An electronic clinical handover template was designed based on the ISBAR3 clinical handover tool (health.gov.ie/wp-content/uploads/2015/01/ISBAR3-Shift-Clinical-Handover-Nov2014.pdf) using Microsoft Word. A Clinical Handover Protocol was produced in order to provide a guide for staff to handover patients. This was distributed to all staff via email and was also available in the doctors' residence.

"DESPITE NUMEROUS CLINICAL POLICIES RELATING TO HANDOVER, FORMAL HANDOVER STRATEGIES ARE OFTEN LACKING IN CLINICAL PRACTICE"

Staff were instructed to hand over all patients in the intensive care unit (ICU) and coronary care unit (CCU) mandatorily. Staff were also encouraged to handover any patients they felt were critically unwell or for whom the on-call staff should be aware.

What you don't measure...

In our centre, we believe in the adage 'What you don't measure, you don't manage'. In order to effectively audit and manage this handover system, we determined pre-defined primary endpoints for our pilot study. These were defined as:

1. Compliance with mandatory handover of ICU/CCU patients
2. Total number of handovers performed
3. Acceptability of handover pilot to physicians

Descriptive statistics of handover activity and compliance with mandatory handover were also distributed to all medical staff on a weekly basis. This audit email also served as a reminder of the handover pilot as well as providing feedback on performance. Medical Staff completed a survey before and after the handover pilot. This survey gathered information on physician attitudes to handover and their experience of the programme.

Results

Clinical handover

Over the six weeks of our clinical handover pilot, there were 191 separate handover events at an average of 31.8 handovers per week. Compliance with mandatory handover of ICU/CCU patients averaged 58.9 percent. Extrapolating out our pilot results for the year would result in approximately 1,655 handover events per annum for our department at our current rate of 58.9 percent compliance.

Physician attitudes

All staff surveyed reported that they were involved in clinical handover. 100 percent of staff felt that written documentation of handover was helpful, and staff satisfaction with handover improved after initiation of the handover pilot (24 percent vs 81 percent, p=0.000914). Doctors reported that the number of handovers missed decreased (35 percent vs 13 percent, p=0.002159).

Whilst 64 percent of physicians were concerned before the pilot that a typed handover would increase their workload, only 6 percent of the post pilot survey group felt that this was the case (p=0.000485). 94 percent of staff felt more comfortable with a formalised method of handing patients over, and their confidence that handover tasks would be completed increased from 18 percent to 81 percent (p=0.000943). It was also felt by the majority that patient management plans were clearer using the handover template (65 percent vs 94 percent, p=0.041381). Overall, 81 percent of staff surveyed agreed that the clinical handover protocol had improved the way in which we hand over the patients under the care of the medical department.

One size doesn't fit all

An important aspect of clinical handover is 'flexible standardisation'. This refers to the local interpretation of clinical standards to accommodate contextual factors in order to maximise the effectiveness of handover (Laine 1993; Australian Commission on Safety and Quality in Health Care 2013). It is also recommended that electronic applications and templates for handover should be developed in consultation with healthcare staff.

Bearing this flexibility in mind, we believe that the ideal clinical handover system would have the following features:

- Traceability: Physician accessing & modifying handover can be traced
- Username/password protection: For patient confidentiality
- Available and modifiable on all computers within a hospital intranet system
- Steady format: All sections of the handover template must be completed
- Printable: Can be printed and brought with physician on ward round

In our institution, our handover format was designed with our services' needs specifically in mind. As such, all aspects may not be applicable, practical or feasible in other

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centres. However, the basic principles and clinical standards should still apply, and it is probable that our survey feedback should be ubiquitously reflective of physician attitudes toward clinical handover.

"PERFORMING AN ELECTRONIC HANDOVER OF PATIENTS IS ACHIEVABLE AND FEASIBLE WITHIN A MEDICAL DEPARTMENT"

What's the benefit?

Effective clinical handover has the potential to improve patient care. In addition it poses several advantages for medical practitioners, both for those on call and for those working during the day.

For on-call staff, it provides guidance on patient care, contingency planning for possible clinical scenarios and 'problem framing'. Problem framing refers to the way in which the definition of a problem changes the way in which one approaches and understands it. 'Framing' a problem can help broaden the range of alternatives and solutions examined. These benefits should act to reduce the on-call workload. For our day staff, it provides a reliable, transparent method for transferring clinical responsibility and accountability for their patients to the on-call staff. In an era of decreasing shift durations, it is essential we provide physicians with a safe method of transferring responsibility for the patients under their care to their colleagues. Starmer et al. (2015) demonstrated a decrease in medical errors from 33.8 per 100 admissions to 18.5 per 100 admissions ($p<0.001$) with improved clinical handover. They also showed a reduction in preventable adverse events (3.3 to 1.5 per 100 admissions, $p=0.04$).

Conclusions and future directions

Our study demonstrates that performing an electronic handover of patients is achievable and feasible within a medical department. Using only a simple Word document and a standardised protocol for its use, we created a cost-neutral solution which would result in >1600 patient handover events per year. It was found to be attractive and effective to physicians without increasing their workload. Looking forward, dedicated software solutions are required to create a reliable, semi-automated clinical handover system integrated with pre-existing inpatient management systems. These have the potential to improve service provision and minimise the risk of adverse events within our healthcare systems. Clinical handover is undoubtedly a complex, multi-faceted process. However, as for many complex problems, the solutions can be surprisingly simple. ■

KEY POINTS

- ✓ Clinical handover refers to inter-clinician communication at care interfaces
- ✓ Clinical handover is a major preventable cause of harm
- ✓ Digital technology has the potential to improve clinical handover
- ✓ In our centre, an electronic clinical handover pilot proved both effective and acceptable to physicians
- ✓ Dedicated software solutions are needed to standardise and digitise clinical handover in our healthcare systems
- ✓ Improved clinical handover could potentially decrease the rate of adverse events and improve patient care

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Deconstruction of business processes to disruption of business models

How healthcare IT can impact business models

What is the potential for information technology to transform healthcare processes and where will the consumer stand?

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For more than eleven years, I have been active via the European Association of Hospital Managers (EAHM) as a pro-bono member of the Board of ENTSCHEIDERFABRIK. This is the incubator for healthcare digital transformation projects and has the longest track history in Germany. More than 150 projects in information, communication, control, and medical technology have been realised in the ENTSCHEIDERFABRIK ecosystem. They have served to demonstrate the "value contribution" of digital transformation to the success of organisations.

The 5 key health IT topics of the 2017 incuabtor process are:

- Case record plus: New ways in integrated care and patient empowerment
- Increasing patient safety through avoidance of mistaken identities via manual scanning of patients and objects such as drugs, etc.
- Digitisation 4.0: Taking delivery of patient data out of Apple HealthKit and Apple CareKit in hospital electronic medical records
- Realisation of a gainful, media-free and legal-secure documentation process with mobile qualified signature
- More time for patients and patient care via meaningful integration of smartphones & tablets in the hospital IT environment

The term "value contribution" has positive connotations. In Germany, digital transformation is generally received in a positive way with tens of millions of Germans using a smartphone.

Breaking down business structures

When we take a look at the phrases "from deconstruction of business processes to the disruption of business models", the perception is fitting in that all this is part of risk communication: what will the effects be of the digital transformation if players do not anticipate, or ideally influence, the changes?

As consumers, we experience what digital disruption means on a daily basis. Stakeholders from the German healthcare segment gained insight very clearly during last year's Entscheider-Reise (ENTSCHEIDERFABRIK delegation) when they attended the Leadership Summit of the American Hospital Association in San Diego.

The ubiquitous question is, how will the patient and his or her smartphone, the citizen and his individual health record or personal consumer-driven electronic medical record—in interaction with institutional medical records maintained by care providers—change processes and structures? And all this is happening in Germany without regulations of the self-governing body of healthcare institutions playing any kind of a role.

In San Diego, delegates were able to experience how hospital chains and health systems combining care providers and payers with up to 94 providers of individual personal health records interact (in all pre-acute in-house cases, acute care, as well as post-acute care). They were shown how patients were able to access these individual health records using their mobile smartphone apps based on their own requirements and conditions, exchanging data with institutional medical records from hospitals at various stages in their treatment processes.

The value of competition

Tying in with the term risk communication, organisations operating institutional medical records, ie, care providers and payers, should ask themselves whether they are already in a position to interact with individual health records. The questions are in concrete; is there a Health Information Management (HIM) strategy and an IHE-conforming platform in place?

These will enable them to tap efficiency potentials in the organisation of their processes due to interaction between the patient, or data consumer, and his individual health record with the institutional medical record – "Digitisation 4.0".

In times of limited budgets, HIM is a likely candidate for solving the problem. Strategic HIM is the key to safeguarding revenue. On the one hand, strategic HIM provides a value contribution to the success of the organisation, or a competitive advantage in comparison with competitors who have no adequate response to

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patients requiring interaction between their personal health record and institutional records—if only at the level of service portals like the booking portal "Booking.com".

On the other hand, IT itself is a critical organisation process and a key instrument for business management, categorised as critical infrastructure by the best practices of the German IT Security Law, which therefore requires the protection of IT systems.

As a consequence, this means that the traditional triad enabling success of hospitals —surplus, utilisation, and investments—will no longer be the result of providing quality and efficient care. Furthermore, putting quality and efficiency in the focus will no longer support or enable that triad.

The way forward for healthcare

When we look at risk communication and the phrase "from deconstruction of business processes to the disruption of business models", the "average citizen" postulated by the statistical yearbook ought to be aware that only those organisations will survive on the market which anticipate, and embrace, the digital transformation.

There are a large number of examples from other sectors of the economy. In tourism, newspaper publishing, retail, and further segments, large-scale transformations have taken place. Are hospitals really so much different from a railway or an airline?

People check in via an app as passengers—and they come "on board". This means they become an essential part of the information management of the respective organisation, and they take on tasks previously carried out manually by staff of the organisation.

Is there still anyone who remembers how these organisations functioned without the significant collaboration of the passengers or other types of consumers with regard to interaction and the exchange of information? Do you or your children still remember paper airline tickets?

The new triad therefore has to be on a footing of Quality, Health Information Exchange (HIE), and digitisation-derived financing models such as "Pay for Quality, Performance, etc." It places the consumer, the citizen, health policyholder and patient driving digitisation in focus. The consumer will be the decisive factor for the success of health organisations. ■

KEY POINTS

- ✓ ENTSCHEIDERFABRIK has incubated 150 healthcare digital transformation projects
- ✓ Consumers understand daily the meaning of digital disruption
- ✓ Healthcare digital transformation is occurring in Germany without involvement of the self-governing body of healthcare institutions
- ✓ A recurring question is where is a Health Information Management (HIM) strategy and IHE conforming platform?
- ✓ The medical record – "Digitisation 4.0" will support efficiency potential in processes
- ✓ German IT Security Law requires protection of IT systems meaning the traditional triad of surplus, utilisation, and investments will no longer the outcome quality care provision
- ✓ Early digital transformation adopter organisations will be market survivors
- ✓ This has already been seen in retail, hospitality and media sectors
- ✓ A new triad should be based on Quality, Health Information Exchange (HIE) placing the consumer/patient centrally

The ENTSCHEIDERFABRIK incubator group at Leadership Summit of the American Hospital Association in San Diego, 2017.

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Enhancing the patient experience with video information

Modern-day devices to help the modern-day patient

How the use of video information and modern-day devices can help with patients who are dealing with anxiety in anticipation of radiology testing and treatment.

In December 2015, Boca Raton Regional Hospital's imaging services department was selected and honoured as one of seven grant recipients by AHRA and Toshiba's Putting Patients First Program. Our proposal was to create a series of applications or short videos about the various imaging modalities and exams performed in our radiology department. Often, patients are feeling anxious and uninformed about their radiology testing and treatment. Our solution aimed to address those feelings with "homemade" visual cues using modern-day devices.

Demographically, we serve an elderly population at Boca Raton Regional Hospital. The average age is 76 years old. According to Press Ganey research, the elderly want to be informed about their care plan during their stay in the hospital. More specifically, they want to know how their care plan will be coordinated during their stay especially with regards to testing and treatment. Furthermore, they want to know when testing results will be available. The elderly are keenly observant to care provider response time, and they listen carefully to what they have to say. These patients also don't like to be rushed in making decisions (Press Ganey Associates 2011; 2015).

Early on, we came up with three unified objectives for our programme. First, we wanted to empower our transporters and imaging staff with new educational materials using modern-day devices. Second, we wanted to enhance the patient experience through improved patient engagement and communication. Finally, we wanted to improve patient expectations and thus alleviate patient stress and anxiety.

Evolving direction

In speaking with the other imaging leaders, it was identified that patients tended to communicate questions and concerns about their radiology testing and treatment at several different encounter points. The first encounter point usually takes place with the nurse on the floor. The second encounter point takes place with the transporter. The final encounter point takes place with the imaging technologist. In general, patients who had concerns and/or questions about the imaging modality or exam either had previous poor experiences or a lack thereof.

We initially wanted to empower the transporters to assist the technologist in educating our patients about the various modalities and exams during the transportation encounter. However, privacy issues quickly became apparent, and transportation challenges became obstacles to progress. As we got more engaged in the project, we came to realise that moving patients in the hallways and elevators with devices playing video and sound about their testing and treatment compromised patient privacy. Furthermore, we didn't want to contribute to the noise level in the hallways and elevators. As for transportation challenges, we experienced an unusually high volume of daily jobs during our high and moderate season coupled with unforeseen transporter turnover. Despite these issues and difficulties, we decided to show our videos at bedside or upon arrival at the modality area. We hope to be testing earphone devices with disposable covers in the near future.

Planning

We both had limited knowledge and experience with Apple products; however, we both felt confident in deciding that the Apple iPad would be the perfect tool or medium to play our planned videos. The Apple iPad has brand recognition and product longevity, and our hospital information technology department was comfortable with the technology. Despite the misconception that the elderly are afraid of or avoid such modern-day devices, we were encouraged to observe that our patient population brought and used their own personal tablets to the hospital during their outpatient visits.

It was our initial intention to shoot and edit the videos ourselves. We identified and considered a

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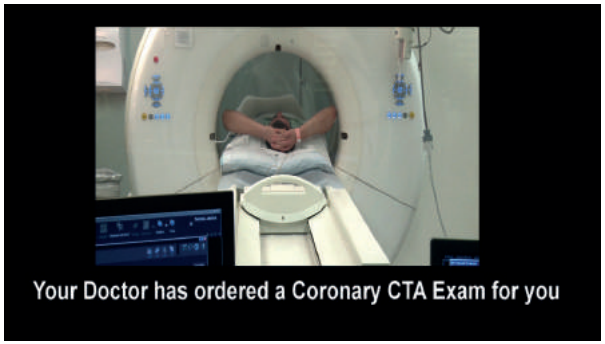

Figure 1. Coronary CTA Exam Video: Introduction

Figure 3. Ultrasound Modality Video: Sonographer performing an Ultrasound exam.

Figure 5. X-Ray Modality Video: Technologist preparing patient for X-ray exam.

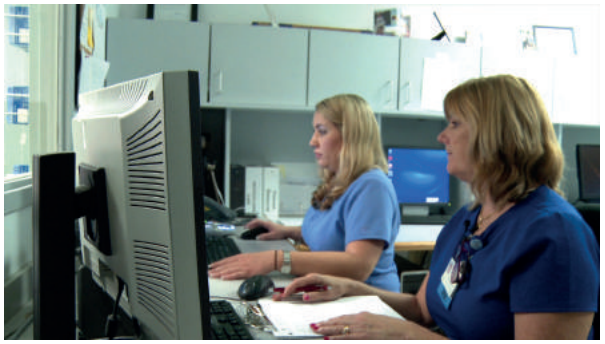

Figure 2. Coronary CTA Exam Video: CT Technologist and Nurse in the Control Room.

Figure 4. Ultrasound Modality Video: Dr. Joseph Kleinman reading an Ultrasound exam.

number of video-making tools and applications including the Apple iPhone, Apple iMovie application, and Go Pro devices. In the end, we decided to approach and go with our resident hospital videographer and expert of all things video, Gary Smith. Gary already had the equipment and expertise. He became our videographer, sound master, and video editor. For video shooting, Gary used a Sony XDCam EX video camera, and for video editing, he used the Apple Final Cut Pro video editing software. Gary quickly

Coronary CTA Exam Storyboard

- Your doctor has ordered a Coronary CTA exam for you.
- A Coronary CTA exam uses advanced CT technology, along with intravenous contrast material, to obtain high resolution, 3D images of the moving heart and great vessels. Basically, these images enable physicians to determine whether plaque or calcium deposits are present in the artery walls.
- Our registered nurses and licenses technologists perform the exam.
- Our hospital uses the latest technology and equipment. For performing Coronary CTA, our hospital uses the Siemens “Flash” dual-source scanner.
- Quality and safety is most important to us.
- Once your exam is completed, processed, and sent to our Radiology PACS reading workstation, a board certified Radiologist will be reading your Coronary CTA.
- Your comfort and safety is our top priority. If there is anything we can do to make you more comfortable, please let us know. Our courteous staff are here to serve you. We are committed to providing you the best experience while under our care.
- Thank you for choosing our hospital.

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became a much sought-out celebrity at our hospital as every department suddenly had video projects for him to shoot, sound, and edit.

We decided to start out with three video concepts consisting of one exam and two modality overviews. We chose the Coronary CTA exam as the first video attempt followed by X-ray and Ultrasound modalities simply because they were the most frequently performed exams. Computed Tomography (CT), Magnetic Resonance Imaging (MRI) and Nuclear Medicine (NM) modality videos came later. We hope to create more specific exam videos in the near future, such as Cardiac Nuclear Stress Test, Port-A-Cath Placement, and other Interventional Radiology procedures

Patti Lee, a nurse working in our cardiac stress lab, was instrumental in helping us write and formalise our storyboard for our Coronary CTA video (Box 1). We quickly realised that our first attempt to write and formalise a storyboard had provided a consistent, usable template for all our other planned videos. Consulting our in-house experts for content and feedback made great sense. We provided time for viewing and critique. We kept our storyboards simple, and that helped minimise our filming demands. The objectives of our storyboards were to:

- Set a mood of safety, comfort, best practices and service culture.
- Explain the modality and/or exam.
- Demonstrate expertise
- Showcase our employees performing exams.
- Showcase our radiologist reading exams.

One of the more interesting topics discussed during our brainstorming and planning meetings was copyright infringement of music. To our disappointment, the unauthorised downloading or uploading of music is actionable as copyright infringement, even if not done for profit.

The biggest challenges to the project were finding time and coordinating crew to film with minimal interruption to patient exams and area workflow. Modality leads were asked to provide a window of opportunity for the crew to film with a strong commitment from us not to exceed 30 minutes. Some days we filmed in the morning, and on other days we filmed in the late afternoon. Filming durations never exceeded 30 minutes. The role of the patient was played by volunteers. The volunteers came from different areas of imaging and hospital, and a number of student interns also volunteered to play the patient.

Implementation

Once the videos were finalised, the implementation of the new programme took place over several phases. The first phase concentrated on the training and education of the staff on the intent and content of the programme. The second phase focused on communication and awareness of the programme within our hospital system. The third phase concentrated on the actual implementation of the programme.

Several training sessions were offered to a few chosen staff prior to the go live date to ensure complete understanding and confidence in implementing the programme. Training on the iPad devices and scripting was important to ensure smooth interaction between staff and patient. Continuous feedback from the staff was encouraged to fine-tune video content, workflow, and execution process.

The new programme was unveiled and shared with our Patient Experience Committee. Their awareness and support was strategic as we embarked to improve the patient experience as it related to imaging. The Patient Experience Committee helped promote awareness of the videos and provided another channel for immediate feedback and dialogue. Although this was an imaging services project, the project was part of a broader initiative and programme to improve the patient experience within the organisation. As mentioned earlier, we decided to concentrate on one exam and two modalities. Other modality videos were introduced more recently. We started out with four iPads and later purchased an additional eight iPads.

Our metrics and patient feedback

We decided to ask three questions in our patient feedback survey to validate our intention and tools. The following dialogue was used with the patient: “Have you ever had an X-ray? As part of our service, I would like to show you a short video about your radiology test. It’s new to our service. It’s about two minutes, basically giving you an overview about what to expect. Afterwards, I would like to ask you three questions. May I proceed?” A small number of patients wanted to see the video, but did not want to participate in the survey. The survey questions were:

1. “On a scale of 1 to 5, 1 being no improvement in expectations, 5 being much improvement in expectations, did the iPad video information about

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(modality/exam) improve your expectations?"

2. "Does the availability of a video increase your level of satisfaction with your testing?"
3. "Does the availability of an iPad tool increase your level of satisfaction with our services?"

Surprisingly, our modality video about X-ray received the least interest from our patient population. More than half of our patients who were approached to view the X-ray video declined to watch, citing that they have had X-rays done before in previous visits or admissions.

Because the 3 videos were created successively and released over a six-month period, the surveys were taken over a 4 to 5-month period. A total of 99 patients were approached to view the video. A total of 80 patients agreed to view the video, but 1 patient declined to take the survey. 89% of our survey respondents scored our videos a "4" or "5" in answering question 1. 94% of our surveyed respondents answered "yes" to question 2. 95% of our surveyed respondents answered "yes" to question 3. We are pleased with our preliminary survey results.

We have received a number of comments from patients who are retired professionals in television and news, advertising and marketing, and even legal praising the idea, quality, and content of our videos. Some of our patient comments so far include:

- "Physician never took the time to explain procedure. Glad to see the video."
- "My first language is French. Video helped me understand what to expect."
- "Great idea. Nice to see technology being utilised in this way."
- "Video exact, not shot on a set but in actual department. Music calming."

Conclusion

On accepting the grant, we took on a long journey. We are pleased with the preliminary responses by our patients, and we envision this programme eventually encompassing all imaging modalities within our ecosystem. We hope that this project will be transformational, delivering information and medical care to the next level. The experience has led us to explore other related avenues and ideas in hopes of enhancing the patient experience and achieving patient loyalty. Thank you AHRA and Toshiba for granting us this programme and opportunity.

Special mention

Special thanks to Denise Caccioppo, our executive director of imaging services, and Gail McNamara, our director of imaging services and transportation services, for their support, guidance, and encouragement.

Special thanks to our cast members: Pedro Acevedo; Jae Bae, RT(N); Lauren De Renzo, RDMS; Rylan Doyle, RT(N); Jameson Habenicht; Noreen Kelly, RN; Rachel Kenny, RT(CT); Joseph Kleinman, MD; Alex Lewis, MD; Axel Lopez; Shena Pacouloute, RT(R); Michelle Petell; Judy Saucier, RN; Susan Sems, RT(MR); Jonathan Shapir, MD; and Dawn Thompson. ■

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KEY POINTS

- ✓ Often, patients are feeling anxious and uninformed about their radiology testing and treatment. Our solution aimed to address those feelings with "homemade" visual cues using modern-day devices
- ✓ The biggest challenges to the project were finding time and coordinating crew to film with minimal interruption to patient exams and area workflow
- ✓ We are pleased with the preliminary responses by our patients, and we envision this programme eventually encompassing all imaging modalities within our ecosystem

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A robotic companion on ward

Fighting hospital patient isolation is the aim of a talkative robot

Looking ahead to increased elderly patient care, researchers have trialled a robot that creates a more social ward environment.

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"What do snowmen have for breakfast?" asks Junior, the hospital's assistive robotic technology, as he stands in front of a bed-bound patient. It's not easy to keep your spirits high in hospital, but the ill lady is distracted by the peculiar creature that stands at half a metre tall on her table. "I don't know; what do snowmen have for breakfast?" she asks. "Snowflakes!" Junior beams back in his mechanical yet affable voice. "Hah, I can't laugh; it hurts," the patient reacts.

It can be so simple to keep a patient company, distract them from their worries and help them with their exercises; but often, hospital staff, family and friends are not available, so patients are left bored, lonely and even depressed. Sadly, this can have profound effects on patients' psychological wellbeing and can subsequently impair their recovery. This concern with regard to the overall hospital experience compelled a group of doctors and researchers to collaborate and search for an answer. The outcome was that they envisaged and developed a robot that could dedicate its time to combating social isolation and improving patients' lives.

The robot's birth

Drs. Marcela P. Vizcaychipi and Yiannis Demiris conceived the idea and in collaboration with the Personal Robotics Laboratory, Imperial College London and the Department of Psychology, University of Westminster, NAO robots were employed to accompany patients in a trial at Chelsea and Westminster Hospital in London.

NAO is an autonomous, programmable humanoid robot developed by Aldebaran Robotics, a French robotics company which was acquired by SoftBank Group in 2015 and rebranded as SoftBank Robotics. The robot's development began with the launch of Project NAO in 2004, and since 2008, several versions of the robot have been released, with the NAO Academics Edition developed for universities and laboratories for research and education purposes. It was released to institutions in 2008, and was made publicly available by 2011.

A new hospital experience

"As far as we know, nobody has done this sort of thing in the hospital before," said Miguel Sarabia, Phd Researcher at the Personal Robotics Laboratory. "Robotics has not yet found the killer app – the thing that robots really do well with the capabilities they have and they haven't. Everybody dreams of a robotic partner, but that's very difficult. We need something more modest. There must be something, and maybe this is it – to give company to patients and make life a little better," he added.

The humanoid robot was introduced to a selection of inpatients and responses were varied. "We have had some people who just ignored the robot and wouldn't look at it and would pretend it wasn't there, to people who found it scary, to people who really liked it, to people that wanted to push the limits of what it could do," Sarabia said.

Supporting all walks of life

Developers hope that the compact robot, which is a combination of technologies that enable him to understand, interpret and act in autonomy, will appeal to patients from different cultures, diverse backgrounds, both sexes, spanning all age groups. "Maybe some will like them and some not. We need to look into all of these environments to ascertain whether the robot is the right technology to introduce at this stage in hospitals," said Dr. Vizcaychipi.

Since Junior is impassive and always positive, researchers believe he can be constructively applied to a range of different situations within the hospital. The assistive technology was used to encourage a patient on the trial to carry out his exercises, making the process more engaging. "It's a revelation really. It does help strengthen the patient. At least you attempt to do a few exercises, which you wouldn't otherwise do if you were a bit depressed," expressed the elderly man who was clearly fascinated by the

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charming automated fellow. When asked if the robot cheered him up, the patient was enthusiastic that it had, as it broke the silence, and they had developed a form of camaraderie.

Approximately 10, 000 NAO have been sold and are in use in more than 50 countries for various purposes. The robot is being increasingly used for research and education purposes in academic institutions worldwide, and was previously employed as a companion to people with autism at the specialised centre, Autistes sans Frontière, in France. The robot forged a special bond with a participant in the trial, Lucas, encouraging him without judging him. Observers noticed that since his encounter with the humanoid, Lucas was calmer and his contact with adults became easier.

Dr. Vizcaychipi, one of the originators of the project in London, emphasised the benefit that the technology offers to elderly and critically ill patients: "My main area of interest in this research is memory – cognitive problems after surgery, after anaesthesia, and after critical illness. And the population is ageing; that is a fact. So we know that by 2020 we will be operating on more people over 65.

"They will be alone, isolated from their own environment. We will be there supporting them from the clinical point of view, but from the social point of view, what are we doing for them? We are isolating them. We are condemning them to an empty room with no memories. So by bringing artificial intelligence, I think we can actually help them to remember the past and look forward to something."

An eye to the future

The robot may not yet have the capacity for deep conversation, but it can search for news and information on the Internet in response to patient requests, and further complexity can be delivered in time. "This is an embryonic phase of our project. If the patients show that they love it, then we need to make it better, and tailor it to the patients," highlighted Dr. Vizcaychipi. "If the patient speaks Spanish, then the robot will answer in Spanish. Not only that, but the robot will interact with real timing; because at the moment, we play the answers back, so it may not seem real, but it's real enough to feel that someone is there," she added. NAO is a character made up of a multitude of sensors, motors and software piloted by a made-to-measure operating system: NAOqi OS.

Winning over staff and patients

The interactive companion robot has not only attracted positive feedback, however. Some hospital staff in the trial were initially opposed to the technology, fearing that it threatened their employment, expressed Sarabia: "Many people fear it's going to take their jobs, but we suggest that these people just watch what the robots do before they come to a conclusion. Many people only know robots from films and science fiction, which is great, but this is not what real robots are about."

Throughout the trial, any apprehension among hospital employees tended to dissolve over time, as they experienced Junior's potential to engage patients on the wards. "After seeing what is was actually about, I haven't had a single nurse say 'oh it's going to take my job' or worry. Most nurses have been very positive about it," said Sarabia.

"Many of the patients may not engage 100 percent. We need to think about why they don't engage and work on that," said Dr. Vizcaychipi, before concluding that the research team will now need to analyse the results of the trial. If they prove it can have a real impact on patients' lives, and is cost effective, their next step is to raise funding to assess the feasibility of introducing this type of technology throughout hospitals. "We have to use technology in hospitals and this is a way of using it in our favour and in our patients' favour," believes Dr. Vizcaychipi. ■

KEY POINTS

- ✓ Patient isolation in hospitals can cause boredom, loneliness and depression
- ✓ To reduce isolation, researchers have created and trialled 'Junior', a NAO robot, in a London hospital
- ✓ 'Junior' can search for conversation topics, play music and have basic conversations
- ✓ Patient response has varied but there was marked overall enthusiasm for the presence of 'Junior'
- ✓ Initially, nursing staff felt 'Junior' would mark the start of robotics takeover of their jobs. After the trial they understood that NAO implementation was not a threat to their jobs and were more supportive
- ✓ Developers are analysing any unfavourable patient and staff response to improve robots like 'Junior'
- ✓ About 10,000 NAO are in use in more than 50 countries for various purposes

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Bringing live music to adults and children across healthcare

Founded in the same year as the NHS and celebrating its 70th birthday in 2018, the UK charity Music in Hospitals & Care continues to deliver the benefits of live music to adults and children right across the healthcare sector.

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The conventional wisdom is that even the Ancient Greeks and the Egyptians realised there was a link between music and human emotion. Even so, it was only thanks to the vision of the late Sheila McCreery that the Council for Music in Hospitals came into being in 1948 and provided its first ever live music concert in the same year. Setting out to provide the therapeutic benefits of live music performances to those whose physical or mental condition prevents them from attending those concerts that the rest of us take for granted, the Council for Music in Hospitals has grown from a local, Surrey-based charity to a national, UK-wide charity with offices in England, Scotland and Wales.

The growth of the charity, now called Music in Hospitals & Care (MiHC), has been somewhat meteoric; having delivered just a few concerts in 1948, 2016/2017 saw the Charity provide over 5,500 live music concerts to audiences of over 128,000 adults and children in healthcare in every nation and region of the UK. And those audiences were in every part of healthcare imaginable, from special schools on the one hand, through hospitals, hospices, care homes and daycare centres, to some very specialist units on the other, dealing with stroke, dementia and critical care.

Research

Music is becoming an increasingly important part of healthcare and there is a growing body of evidence to suggest that taking part in, or experiencing music can have significant benefits on our overall level of wellbeing. Specific studies have highlighted the benefits to be gained from music for those suffering with dementia, tinnitus, bipolar disorder, multiple sclerosis and chronic pain or fatigue. In addition, numerous studies carried out with musicians, caregivers and their families have reported that engagement with a wide range of musical activities continues to be rated highly amongst the various activities enjoyed by residents in most care facilities. The reported evidence strongly suggests that the ability to enjoy and engage with musical elements in a meaningful way remains strong although other cognitive functions deteriorate. Accordingly, music continues to become increasingly accepted as a beneficial non-pharmacological intervention in a wide range of care contexts, whilst in tandem with this, a growing number of studies have also reported on the relatively limited effectiveness of commonly used medical interventions.

Certainly, music appears to bring with it numerous benefits, but many questions remain unanswered. We know little about the relative benefits gained from musical events as opposed to armchair exercise or craft activities for example. Similarly, research work with those living with more severe forms of dementia requires new and innovative research tools to be developed including more quantitative measures that move well beyond the standard approaches of questionnaire and interview. For example, as part of our own research programme with Dr Nigel Marshall, we have been involved in pioneering the use of salivary biomarkers as a means of giving voice to people living with a range of severe cognitive disabilities by measuring their relative levels of wellbeing before and after musical events.

> "OUR CONCERTS ARE NOT ABOUT RECITALS BUT ABOUT ENGAGEMENT"

Overall, the results from our research programme are very specific. The picture emerging from the research data is that music is a soundtrack to life from which all can benefit. The chance to engage with musicians is not only enjoyable and beneficial for clients in a wide range of care facilities and contexts, but also particularly effective in promoting both emotional and physical wellbeing amongst all those involved in the process of caring.

Musicians

The high quality of music is one of the hallmarks of our live music sessions but so too is the ability for musicians to engage with the audiences. Our concerts are not about recitals but about engagement and, to be honest, not all musicians

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are able to connect with audiences in the environments in which MiHC works. The settings can be quite emotional and sometimes disruptive but the concerts are always demanding in their own way. As a consequence, each and every musician is selected through a rigorous audition process with auditions taking place in healthcare settings; in our view it is the only way to ensure the musicians we select are able to cope with the demanding circumstances in which they will work. The audition is but the first step and mentoring and regular get-togethers ensure we refresh our practices and learn from each other, thereby delivering the best possible performances that we can.

Projects

Across the UK, our teams are delivering a range of projects for particular parts of the community, focusing where possible on those areas of special need and deprivation. Often this will be geared to the wishes of the donors and supporters who provide the funds to enable the live music concerts to take place. During the recent past such projects have included the ex-service community, especially during the centenary of the First World War and its many battles, those living with dementia and those in care from the seafaring community to mention but a few. However, amongst the many are a couple of projects that deserve more explanation here.

ICU-Hear

This innovative project has been developed to provide regular professionally performed live music within critical care units (Ashley-Taylor 2017). Musicians play a carefully chosen repertoire at the bedside of critically ill patients. The music creates a soothing ambience in this highly clinical and sometimes intimidating environment and helps to humanise the experience of patients at a very difficult time in their lives. The project came about as a result of the experiences of one of our long-term volunteers. In 2015 she was treated in intensive care after unexpected surgery. Her experiences on ICU left her traumatised and following her medical recovery, she attended several support groups in the area. Not initially being aware that her own experiences resonated with former ICU patients but after meeting others and sharing accounts of the effects of prolonged anxiety and delirium experienced by many, she realised the long term ramifications a stay in ICU can have. Many former ICU patients struggle with daily life after discharge – awareness of this fact is sometimes poor amongst friends, families, some GPs and many employers. Recovering pre-illness life and/or livelihood can be enormously challenging.

At the Manchester Royal Infirmary (MRI), Natalie Mason (Critical Care Follow Up Sister) and Donna Cummings (Lead Nurse) were simultaneously exploring ways of how to humanise the critical care ward for patients. There is a growing recognition amongst clinical staff that although critically ill patients are often treated successfully for their physical conditions, their experiences of critical care can leave them emotionally and psychologically scarred. In conjunction with our volunteer and the MRI hospital staff, we explored ways in which therapeutic live music can be used for the benefit of critically ill patients on the intensive care and high dependency units. Together we discussed the possibilities of using carefully delivered music to help patients cope with fear, pain, trauma, sedation, delirium and disorientation.

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Considerable planning and preparation was needed before the first music session took place. We identified suitable musicians who demonstrated the necessary qualities needed to deliver appropriate music at the bedside in such a sensitive environment including gentleness, flexibility, calmness, resilience and the ability to play soothing music from memory. Choice of appropriate instruments was also important as the ability for a musician to improve a stressful clinical environment is partly dependent on the sonorous quality of the instrument they use. Having carried out all the preparatory work we then embarked on a pilot project in July of 2016 consisting of 4 one-hour long music sessions on the ward. The success of the pilot project has been such that we now organise regular sessions on other critical care wards throughout the North of England: Stepping Hill Hospital, Salford Royal, Aintree Hospital (Liverpool), Northern General Hospital (Sheffield), Freeman Hospital (Newcastle) and Sunderland Royal. The project is currently being rolled out across the rest of the UK and the ICUs at St Mary's Hospital Paddington and University Hospital Coventry have recently had their first sessions delivered. At the same time we are training more MiHC musicians from Scotland and Wales to deliver sessions across a wider area of the UK. Interest in our ICU-Hear project has gathered momentum and we have had specific enquiries from the Netherlands and more general interest in our activities from Lithuania and China.

Lullaby Hour

Our Lullaby Hour project provides gentle lullaby music sessions for children and babies in the Children's Heart Unit at the Freeman Hospital in Newcastle-upon-Tyne. The concerts take place fortnightly in the early evenings. Our skilled musicians visit each child, moving from bay to bay, singing and playing their instruments in a gentle and soothing way. One of the real benefits of having such talented musicians is that they can weave each child's name in the songs they are singing. Sometimes the children are able to engage and are playful—our musicians are able to respond to the energy of each child in a flexible way. At other times the children can be very poorly and weak—in this case, the rhythmic sounds and eye contact with the musicians can show that the children are clearly settling. Observations made during the sessions showed that one little girl's heart rate lowered during the singing, and then rose again when the singing ended.

Lullaby Hour has proved especially successful as it provides a comforting 'bedtime' atmosphere for the children and can thus help to soothe them. Parents can also share a moment of normality with their children and are also calmed by seeing their children smiling and engaging with the lullabies. Parents sometimes join in with the singing. One parent became very tearful and said to our musicians: "You sing so beautifully. Please don't stop." Many parents take photographs and film of their children smiling and laughing during the sessions. On occasion, parents can't be there at bedtime—in such instances our musicians work closely with the Specialist Play Nurse, who supervises all the sessions, and who will often cuddle the babies and children during the lullaby.

We are very keen to roll this project out to other children's hospitals and hospices across the UK as we have with other projects. We also hope to produce a Lullaby Hour Songbook with audio that will be available via our website for anyone to access.

As we celebrate our 70th birthday milestone together with the NHS, we will continue to deliver live music concerts to those in healthcare in every corner of the UK and Northern Ireland; from the Highlands and Islands of Scotland, to the tip of Cornwall, from West Wales to East Anglia—and don't not forget we include the Channel Islands too— let the music play! ■

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Health spending in Greece under restraint measures

Way forward for sustainability of healthcare sector

Healthcare in Greece is facing a crisis. How does health spending compare with other European Union countries and what is the way forward for a sustainable future?

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Current situation

Across the Eurozone, there is a need to reduce fiscal debts and deficits, and therefore to reduce annual public spending. This policy is being stifled, however, and the countries that are affected are those in the south. Economic uncertainty, and the application of austerity measures as a precaution, are endangering the viability of the countries in the European Union.

This report sets out the need for the national health systems (NHS) in Greece and other countries of the Organization for Economic Cooperation and Development (OECD) to reduce and secure financial resources, while providing comparative data on the state of national health and assessing what was spent in the period 2000-2012. It also aims to explore the measures that could curb spending in Greece. At the same time, it suggests alternative sources of funding, based on a reformed trend in the healthcare sector, under the supervision of the International Monetary Fund and European partners.

Figures show that after an initial upward trend, health costs in OECD countries tended to decline after the start of the recession, until 2010 (Eurostat 2012; OECD 2012). This suggests that strict supervision, in conjunction with the limitation of resources and rational allocation of these, tends to create an NHS that is competitive and worthy of users' expectations, while contributing to changing a pre-existing culture.

Based on the financing, production and distribution of health services, the basic health systems organisation models are the Anglo-Saxon model, the Continental model, the Scandinavian model and the South African model (Rekliti et al. 2012).

According to the OECD, Greece has a healthcare system based on a mixed and comprehensive national system, contractual insurance schemes and an insurance compensation scheme, which draw on different organisational models. Meanwhile, it incorporates elements and features of the private sector. This set of different systems and different models, combined with a lack of coordination and control mechanisms, has contributed to the creation of difficulties and mismanagement of the healthcare system, as well as to inadequate strategic management and weak implementation of a national policy on health for the past twenty years. The main feature of the insurance system in Greece was the existence of a large number of insurance schemes, covered by the Ministry of Labour and Social Security, most as legal entities under public law and under the supervision of the state, that created inequality both in access and financing of healthcare services (OECD 1992; 2010; Economou 2012; Rekliti et al. 2012).

"THE ONGOING ECONOMIC RECESSION MEANS THAT 36.2 PERCENT OF THE POPULATION IS DEPRIVED OF RESOURCES FROM THE HEALTHCARE SECTOR AND INSURANCE COVERAGE"

During reforms in Greece from 2010 onwards, the pension funds came under the control of the Ministry of Health and Social Solidarity and the merging of social insurance funds (IKA, OGA, OAEE). The National Agency for Health Care Services was established, which covers 90 percent of the population, with the prospect of a comprehensive assimilation of the remaining funds (Economou 2012; Milona et al. 2012). The Greek NHS initiated changes from 2011, including

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direct and indirect taxation and the implementation of closed-consolidated hospital fees. Meanwhile, doctors working in health centres and public hospitals were considered in full and exclusive employment, salaried and dismissed from private practice. Another change was to the pricing of medicines, which came down to EOPPY and the Ministry of Health Care (National School 2011; Economou 2012; Rekliti et al. 2012).

Given the budgetary surveillance within Greece's social policy, because of the large debt and loan crisis in the markets, unemployment and recession are considered negative factors in establishing a social framework. Moreover, there has been an effect on the health of the population and the NHS. Under the terms of the loan agreement with the International Monetary Fund are significant reductions in human, financial and technological conditions, with a focus on hospital expenditure, pharmaceuticals and social health insurance.

The current economic situation, high unemployment, combined with excessive retirement of staff in hospitals, wage cuts, pension changes, the new way of funding hospitals and mergers have imposed further corrective changes in the operation of the National Agency Providers Health services (National School 2012) in order to contain costs and enhance financing and profitability. Health spending (global, public, private, hospital and outpatient) for Greece from the year 2000 can be determined and compared to health costs in other countries of the European Union. This report cites the most important measures that could be implemented to curb health spending, with a main consideration of equality with regard to access to insurance coverage. Finally, based on medical effectiveness, social equity, justice, and economic efficiency in the light of health reforms, it explores the most appropriate source of funding for the NHS to adequately achieve sustainability.

Health spending in Greece and European Union members from the year 2000

Health spending has taken up an increasing amount of Gross National Product (GNP), reaching the rate of 8 percent of GNP in 2000, both for Greece and for the countries of the European Union. The continuous increase in health spending was due mainly to the indiscriminate use of and always evolving medical technology, constant social pressure for improved services and the ageing population of the continent as a whole (Towse and Sussex 2000), without the corresponding upgrade of health. Rising costs coupled with the economic recession led to the crisis in health systems, since it was found that the increase in costs did not result in better health in the population (Souliotis 2000; Souliotis and Kyriopoulos 2015).

For OECD countries up to 2008, and in Greece in particular, the increase in material and human resources in the NHS has created a very high rate of increase in health spending - almost three times the average. This has spurred high participation of the private sector and the transition of healthcare from the public sector to commercialisation (Souliotis 2000; Tountas et al. 2005).

In Greece, in the period 2005-2009, public spending was 17.8 percent of GDP growth while overall health spending rose by 45 percent. Comparatively, for the 2009-2011 period, the public spending proportion of GDP fell to 9.8 percent, along with a reduction of total expenditure at 18.9 percent, as shown in Table 1. According to official OECD figures, as per the table below, up to 2007 the countries allocated on average 8.9 percent as a percentage of their GDP on public and private health spending. Denmark has the highest rate with public expenditure at 8.7 percent of GDP, while private expenditure amounted to 1.5 percent, which was the lowest rate. Greece followed low on the list, with the percentage of private expenditure touching 2.3 percent through private insurance. In contrast to 2009, where public and private expenditure in Greece occupied 10 percent of GDP, for 2012 the rate fell to 9.3 percent, due to the sharp cut in public spending as a measure of fiscal policy to reduce deficits. For the same year, France, Germany, the Netherlands and Switzerland gave more than 11 percent of GDP (OECD 2014).

Restraint measures for health spending in Greece

The ongoing economic recession, high unemployment, the reduced working population and uninsured work has had the effect that 36.2 percent of the general population are deprived of significant resources from the healthcare sector and insurance coverage. Meanwhile, EOPPY seems to need further improvement and adjustment. In light of this, it is appropriate for EOPPY to serve as a medical complex, improve the structure of the holding costs and further strengthen internal competition for suppliers. It should also boost the individual users' choice and the competitive relationship between primary and hospital care. These perspectives tend to promote higher quality care at the lowest cost (ELSTAT 2014; Kyriopoulos 2014; SEA 2013). Because of economic problems, limited measures exist to curb expenses in order to protect insurance coverage and universal access. Thus, we considered the following:

- Definition and placement of the employed workforce in the EOPPY bodies to be based on the added value that the entity produces to create new conditions of employment stimulus
- The necessity, via detailed knowledge of hospital costs, to redefine the state subsidy of the state provided to hospitals and which is transferred from economic resources to EOPPY. The above redefinition

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will serve in each incident case and compensation of hospitals can be achieved through the homogenous system diagnostic groups (DRGs model)

- Inspection and evaluation of the production and distribution of care imposed by the introduction of clinical, administrative and nursing audit, as well as ongoing evaluation of pharmaceutical and biomedical technology, and insurance checks
- Social mitigation that has arisen following the global economic crisis. This involves the presentation of different rates in health spending, which is proportional to income, the weak economy and lack of free access to the NHS for the unemployed, the elderly, and those with chronic disease, without endangering insurance
- Finally, the appropriate management of chronic diseases and the national implementation of a screening programme in primary care. This is expected to save financial resources and eliminate any weaknesses in the therapeutic approach (National School 2010; Kyriopoulos 2014; 2015).

Alternative sources of funding the National Health System

The reduction of financial resources for the health sector requires a redefinition of the funding sources to be considered remunerative, with a key parameter being to follow the criteria of medical efficiency, social equity and justice, but also of reciprocity. The EOPYY monopoly exerts its power through the reduction and control of expenditure, which requires:

- The creation of restricted budgets
- The consolidation of internal competition
- The strengthening of funding sources, given the economic situation in the country
- The rapprochement insurance package, based on practical effectiveness. Its viability also requires the delimitation of state subsidy to cover the contributions at roughly the rate of 7.65 percent.

"ANOTHER SOURCE OF HEALTHCARE FINANCING INCLUDES TAXATION ON HEALTH-HARMING PRODUCTS SUCH AS ALCOHOL, TOBACCO AND SUGARY, FATTY PRODUCTS"

Given that the objective of social policy and social security is to eliminate health risks and prevent economic waste, the degree of insurance coverage is the basic parameter of social negotiation. At the same time, it is appropriate and necessary to redefine the government grant to public institutions, with increased financial resources both for primary and hospital healthcare. Under the suffocating fiscal policy, retesting the design and setup of the Health Charter will help ensure its longevity, and lead to better distribution and proper functioning of health units.

High unemployment rates and changes in employment relationships have led to insecurity with regard to insurance contributions, exacerbating the need for reorganisation. In conclusion, the level of contributions may be set inverse to employee number and the relevant entity-operation to strengthen and stabilise macroeconomic employment, and to achieve payment of the corresponding tax. Control of medical practice under the supervision of experts and the determination of the insurance package based on economic efficiency and clinical efficacy may ensure the redefinition of the insurance package as an additional option to take measures to re-finance the NHS.

Another alternative source of financing includes taxation on products such as alcoholic beverages, cigarettes, and products with high sugar content and saturated fat. The benefit clearly appears double by saving financial resources, and promoting the health of citizens by avoiding consumption of such products and reducing morbidity and mortality in the country, resulting in the creation of additional economic and clinical benefits.

Finally, the management of chronic diseases, such as diabetes, cancer, heart disease, osteoporosis, etc., combined with the ageing of the population and comorbidity, being the main stress factors of the health system, with the simultaneous establishment of a single national screening programme control, can cause favourable results and significantly reduce the need for clinical monitoring, with the consequent reduction of clinical and economic costs (ESDY 2010; Influenza Pandemic, 2012; own 2017).

Future discussion

The Greek healthcare sector has over the years shown a disproportionate burden on the economy, which has brought with it a continuous decline in the public sector. Meanwhile there has been a growing economic burden on citizens, with additional payouts for ensuring higher quality health

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Statistics	
Total population (2015)	10,955,000
Gross national income per capita (PPP international $, 2013)	25
Life expectancy at birth m/f (years, 2015)	78/84
Probability of dying under five (per 1, 000 live births, 0)	not available
Probability of dying between 15 and 60 years m/f (per 1, 000 population, 2015)	99/45
Total expenditure on health per capita (Intl $, 2014)	2,098
Total expenditure on health as % of GDP (2014)	8.1

Source: Global Health Observatory. World Health Organisation who.int/gho/countries/grc/en/

services. The total health expenditure showed an upward trend in 2009.

The sustainability of the NHS in Greece is a major challenge. A key issue that arises from this article is that of uncontrolled health spending, the International Monetary Fund and its imposed control mechanisms towards the reform torque sector, and a subsequent reduction in spending during the economic downturn, with a stable downward trend in 2012, both in Greece and in EU members. At the same time, the establishment of EOPPY and the merger of the pension funds show the mood for elimination of established relationships that existed in the NHS and led to a waste of public money.

KEY POINTS

- ✓ In the Eurozone, fiscal debts and deficits must be reduced leading to annual spending cuts
- ✓ Greece's healthcare system is a mix of models which leads to funding complications
- ✓ Owing to continued economic crisis and unemployment, a significant sector of the population receives no healthcare protection
- ✓ Alternative funding models include revised health insurance models and taxation on unhealthy consumer products

The aim of the health policy clearly must be to reduce health expenditure in order to avoid further burden on Greek households and, at the same time, to improve patient outcomes and support the NHS in a bid to become more competitive. ■

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HUGO SANER

CONGRESS DIRECTOR - EUROPEAN CONGRESS ON ECARDIOLOGY AND EHEALTH

TOP QUOTE FROM BLOG:

How does a local heart foundation benefit research and public health?

"With a local heart foundation we saw that—when local cardiologists are actively involved on the board of such a foundation—we can have further impact on cardiovascular health in the region."

See more at: **https://iii.hm/h59**

KARL BRAUNER

DEPUTY DIRECTOR-GENERAL - WORLD TRADE ORGANIZATION

TOP QUOTE FROM BLOG:

Sustainable access to affordable medicines: how can the multilateral trading system contribute?

"Trade is not just an economic activity. It is how many countries obtain access to the fundamental needs of human life and wellbeing, notably essential medicines. No country can realistically aspire to be fully self-reliant in pharmaceuticals. International trade is therefore indispensable for access to medicines, truly a lifeline for many developing countries."

See more at: **https://iii.hm/h52**

ARNAUD HANSSKE

EXECUTIVE DIRECTOR OF THE MEDICAL INFORMATION DEPARTMENT AND THE KASHMIR LAB, CIO, FRANCE

TOP QUOTE FROM BLOG:

Reflections on smart data healthcare future

"The mass of information that is not completely organised today will inevitably become so and open up new possibilities from the simple disappearance of paper giving way to new concepts and adding value to information - if it is well organised, used, interpreted."

See more at: **https://iii.hm/h54**

LUKAS LAMBERT

HEAD OF CT DEPARTMENT, RADIOLOGIST - GENERAL UNIVERSITY HOSPITAL AND FIRST FACULTY OF MEDICINE, CHARLES UNIVERSITY, PRAGUE, CZECH REPUBLIC

TOP QUOTE FROM BLOG:

Appropriate utilisation of imaging and defensive medicine - where do we stand?

"Broadly speaking, more examinations are performed which, instead, potentially harm the patients, decreasing the benefit-to-risk ratio of our diagnostic test. The overuse of CT has other implications as well, including radiation exposure, organisational issues, and increased costs. Despite this, we strongly believe that current practices will be difficult to change unless clinical decision support is not only endorsed, but legally supported."

See more at: **https://iii.hm/h58**

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