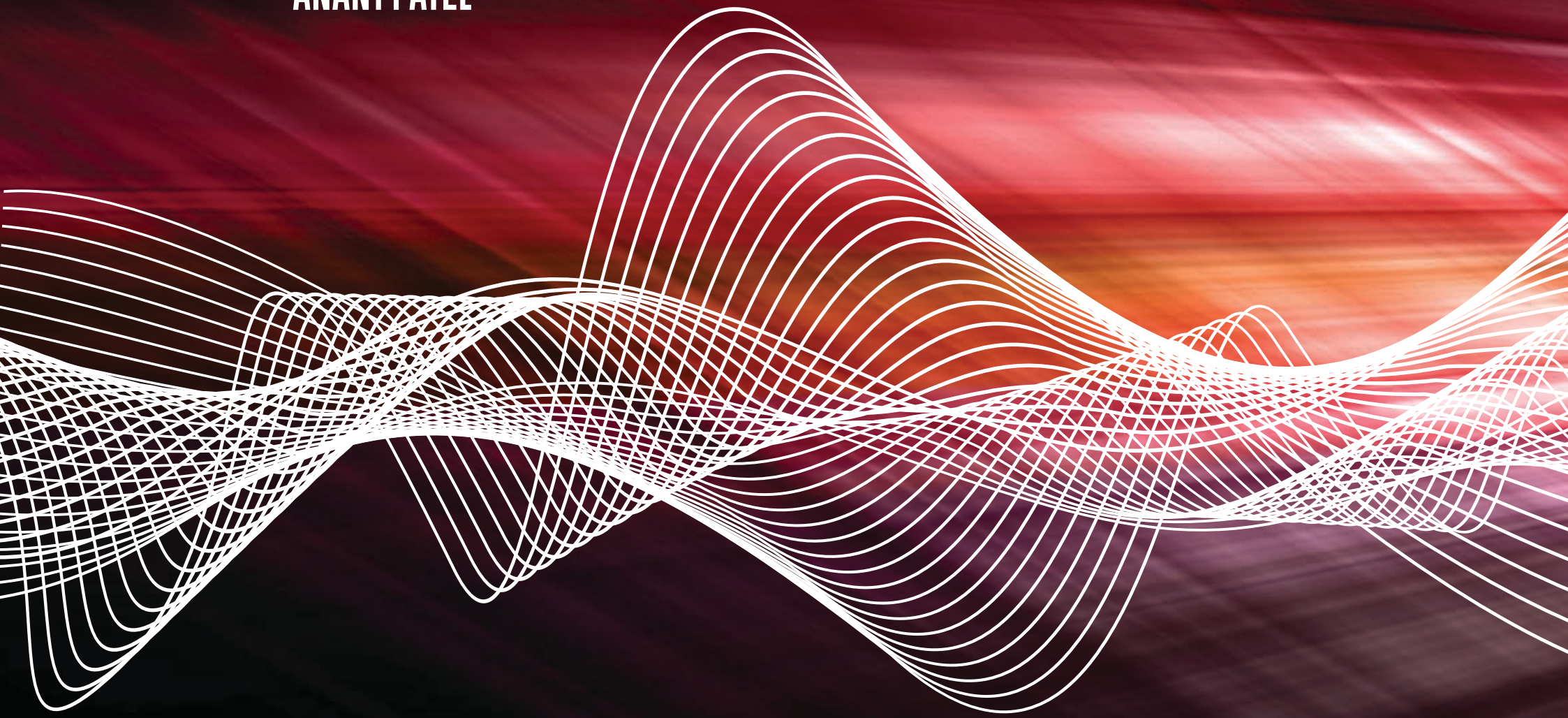
{50} RADIOLOGY IT: MOVING ON FROM PACS

ANANT PATEL



In 2012, the Commissioning Board's Informatics Chief wanted a commitment for the NHS to go paperless by 2015[1]. This year the Health Secretary[2] indicated that the NHS should be paperless by 2018 to save billions for service improvement and help meet the future needs of an ageing population. Who knows if a later target will be offered next year?

Slippages like these are the norm in public sector as the published timelines are often described as ambitious. The form of healthcare that will be needed to fulfil these ambitions is currently known as health informatics (evolved from medical informatics), which is designed to send accurate information to the correct person at the right time[3]. This article will discuss a few of the emerging aspects of informatics that may affect diagnostic imaging in the future.

The true origin of imaging informatics

The success of Picture Archiving Communication Systems (PACS) worldwide has embedded and pushed radiology within UK informatics departments to the forefront, overtaking one of the original types of clinical information systems (CIS), ie Laboratory Information Management System (LIMS), due to the use of digital images[4]. The clinical division of Pathology was formerly the CIS that pioneered request referrals known commonly as 'order comms' which are basically structured electronic messages. However, the requirements for radiology-related systems have been prioritised increasingly over LIMS desires due to the complexities of dealing with a patient in real-time and at a specific location (imaging department), rather than a pathology sample that can be processed anywhere. Also, the need to consider the Ionising Radiation (Medical Exposure) Regulations have superseded LIMS requirements for systems such as GP electronic requesting. I have been involved with two joint laboratory/radiology order communication related projects where radiology requirements have over-ridden LIMS requirements for the above reasons; the LIMS suppliers were unable to meet the relatively more complex radiology needs and flows with various radiology information systems (RIS). This may now change unless imaging departments are aware of what may happen in the future with the current push in informatics for cost savings as well as improving patient care.

Many Trusts in the UK have imaging departments with long established information systems such as RIS and PACS, along with voice recognition (VR), and other tools and applications. Some Trusts have incorporated the above systems into electronic patient records (EPR), which are digital data within a particular Trust/hospital. This is the direction that Tim Kelsey[1] of the NHS Commissioning Board and Jeremy Hunt[2], the current Health Secretary, are advocating. However, already two steps ahead of the electronic patient records system is the electronic healthcare record (EHR). It should be noted that the EHR is being muted as the way forward since it will enable the digital capture of information from 'the cradle to the grave', initially with patient access via a clinical portal. Furthermore, the EHR is not just confined to a hospital record but one that should include GP, NHS and Social Service systems except when an individual opts out. It has been suggested that patients will be able to download their GP held information using a concept similar to the 'Blue Button' developed by the US Department of Veteran Affairs[5].

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Downloadable data will be personal health information, such as self-entered data and results held by the system, and can be downloaded as a text or PDF file after the necessary authentication. This will be trialled initially with GPs[6]. As well as textual information; this could include key radiology images, similar to the way some patients are given radiology images on CDs, but with more healthcare data. However, unless the record is easy to use it will not be successful, and the take up will be low, which was the downfall of a recent attempt called HealthSpace (launched by the NHS in 2007), where patients found it too difficult to create an account and even to log into[7].

The integration of RIS and PACS into EPR is a natural progression to enable order comms (requesting and results messaging) from primary (GP) to secondary care systems and vice versa. EPRs also allow applications such as scheduling (appointment bookings) to be used for various departments, ie for radiology, outpatients, therapies etc, giving authorised users in radiology access to a patient's non-radiology appointments. This enables the connecting of data to allow opportunities in healthcare which will increase productivity (successfully achieved with PACS), safety through having access to accurate records, quality of data improvements, more accurate analytics (data analysis) and hopefully decision support (tools to help make clinical choices)[8].

Many imaging departments are now 'paper-light' or paperless and are in a strong position to influence the rest of the acute sector CIS with the lessons learnt. However, having multipurpose systems that can be used in various departments (enterprise-wide) such as scheduling, non-radiology order comms (requesting and reporting pathology/cardiology/endoscopy/audiology etc) could reduce the functionality required in a RIS. This approach is currently influencing the present wave of PACS procurements, as Trusts that have merged, or are about to merge, need to provide a quick common cross-site reporting work flow, that may not be able to wait until a trust-wide radiology compliant EPR or RIS can be deployed. Hence, a PACS-centric reporting workflow would circumnavigate the need to adopt an EPR or RIS that may not be have the same specification as more specialist non-EPR RIS. As long as the EPR is still patient-centric then PACS-centric (reporting in PACS), as opposed to the common RIS-centric flows may be used successfully in the future. Providing there is interoperability with the future EPR of the merged Trusts, there would be clear benefits of being able to quickly deploy a merged reporting radiographer/sonographer/radiologist solution that could be used across all sites.

"TWITTER IS THE MOSTLY LIKELY SOCIAL MEDIA PLATFORM TO BE USED IN HEALTH INFORMATICS"

Currently, multidisciplinary team meetings utilise anything from a PACS to images stored on portable media (CDs or secure hard-drives) to access images and radiology reports. The additional information from an EPR (pathology results/future diagnostics and appointments) will further link professionals and enable them to access instantly other analytics. The driver for more locally delivered projects to cater for the community will expand the concept of multidisciplinary team meetings to a wider group of professionals who need to access data from various unconnected systems, probably via a clinical portal (a central access point to appropriate data). This can be adapted to suit the needs of users in a community, linking together data that are kept in 'silos', enabling the right people to access relevant applications, data and services[9]. Initially, this will probably not be a single seamless record, but a way of 'dipping' into the silos of information to retrieve relevant data, be they images or textual records. To ensure portals work, the use of standards, frameworks and implementation guides suggested in the Interoperability Tool Kit[10] may help. This is not a piece of software or a product but a focus on the business needs of local organisations and communities. Currently, EPR and GP systems are being linked through a Health Information Exchange to allow real-time access for GPs and healthcare professionals for improved health outcomes[11]. This allows a GP to access a patient's local EPR and for Trusts to access GP records after the relevant data sharing agreements have been agreed between the relevant groups.

Implementation of any healthcare technology is a 'group and communications' activity, where feedback is required and quality assurance should be performed technically and socially[12]. This has occurred within radiology via a number of different media such as emails from the Society of Radiographers to members, via non-radiography groups such as the informative weekly NHS Networks email digest, websites (E-Health Insider), and forums such as the extremely successful UK Imaging Informatics Group. Although there has not been a successful central authority that has managed to act as a single point of reference, the National Allied Health Professions Informatics Strategic Taskforce had tried to lead, advise and form understanding. Finally, regarding communications, Twitter is the mostly likely social media platform to be used in health informatics, if the organisations give staff the relevant access. This could be used for real-time patient feedback, keeping patients and staff informed, patient education, and enabling followers to be exposed to similar organisations[13].

Economic options

Some healthcare organisations have implemented open source healthcare applications, which have massive cost savings as long as staff are available to support the application. Open source software and applications are developed collaboratively and are 'freely available'[14]. Hence the deliberate use of the 'conceptually similar' Wikipedia for this reference, which many academics will not take seriously for information accuracy. However, the sources at the bottom of the Wiki are useful and more informative than a Google search, which is the most popular form of searching for information. It should be remembered that the open source concept was used for developing network protocols for the World Wide Web and Internet with free licensing, which has, of course, revolutionised healthcare, as well as virtually everything else we know. It is a lost opportunity with the recent PACS procurements, as there are solutions available that may not be as polished as the commercial products but are fit for purpose. Furthermore, they are being used in many institutes internationally, for example, using OsiriX Foundation on Apple Mac operating systems[15]. If one were to invest time and resource staff (centrally) a variety of free imaging software is available[16] and this would have massive cost savings as organisations would have to invest only in implementation, integration, support, training and development, and not for the pockets of the shareholders of the PACS/RIS suppliers. However, the following ingredients are essential: expert advice; good quality software; maintenance of the software; and ensuring licensing laws have been followed correctly[17].

An organisation that is ready to invest some resources into exploring this can implement a system at a fraction of the cost of commercial

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'off-the-shelf' solutions, and drive down maintenance and other charges. Unfortunately, the products cannot currently compete against the reluctance of informatics departments to explore such avenues, as it is easier to pay a supplier a large amount of money to manage such a product in the short to medium-term than invest for the longer-term. Surprisingly, data protection and confidentiality in such systems are deemed more secure than commercial products[18], however, the fear of who exactly will support the system is the biggest concern if there is an issue. That said, the 'paid for support' provided by some large companies leaves a lot to be desired.

The introduction of mobile technology (laptops/tablet/mobile phones/ digital pens) within radiology has been questioned but has proven useful for reference, learning, consultations, communications with patients, and diagnostic reading[19]. However, most of the high quality applications are available only on the iOS platform (Apple), with the expectation that the other platforms such as Android will catch up soon. Applying them directly in a PACS/RIS setting is still to be demonstrated within the UK, though Bulmer[20] has recently hypothesised their use, and listed advantages as being the possible reduction of paper, help with checking in patients, and signing consent forms. There is also the current risk of bringing your own device (BYOD) be it laptop/tablet/smart phone to accomplish an activity, but also possibly bypassing your organisation's systems and processes. This, along with using powerful collaborative applications and social media, poses risks to data security[21].

The future

The House of Commons Select Committee[22] reported that lessons have been learnt from various national programmes involved in developing electronic patient records and, as a consequence, identified the need to focus on ensuring local involvement in delivering projects. It must be reiterated that informatics requires long-term investment before socio-economic returns are realised, which may be qualitative rather than quantative. Implementation will continue to be problematic in terms of change management, due to claims about the benefits of the information technology not being believed by healthcare professionals and the forgotten administration and clerical staff[12]. Based on personal experience, when a paper-light EPR system has been fully operational for a number of months and the system becomes unavailable for a day or two, users will probably go back to their paper contingencies. It's only then that the users realise and appreciate the benefits of the system, even if it has workarounds.

The current economic climate is an added complication in that Trusts taking a systems approach when selecting IT solutions may compromise on the clinical information solution, ie it may not be the best of breed but will fit the current systems. Hence developments will continue to be less revolutionary than the National Programme for IT, but more iterative in the sense of local developments that, if successful, will probably be shared slowly, as there will probably be very few mechanisms of sharing of good practice. There will be reliance on the communication methods stated previously and on the advice of current users of systems and suppliers of the products.

Conclusion

In reality, target dates for going 'paperless' may change, as shown by both Kesley[1] and Hunt[2], but this will give some time for realising such a huge project, particularly with the constraints that are inevitable with the current economic climate and the uncertainty of the outcome for 2013 NHS reforms. Brave choices will still need to be made in the acute sector if EPR/EHR and other innovative systems are to be adopted; these may not necessarily be the best CIS but may be ones that have a high level of almost seamless integration by 'talking to' the EPR and other health informatics systems.

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