Going electronic: an Epic move

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Abstract

Medicine and dentistry have historically existed as separate entities, resulting in the creation of separate patient health records, which may limit patient care and safety. The General Dental Council emphasise the need to ‘make and keep contemporaneous, complete and accurate patient records’ as part of the expected standards of the dental team, with no suggested preference on paper or electronic notes. Despite offering clear advantages in primary care dental practice for efficiency, patient accessibility and financial benefit, the comparatively limited uptake of electronic records in dentistry in the secondary care setting has created barriers for patients and clinicians in delivery of evidence-based oral care. In this paper, we report on the challenges and benefits presented by the national drive to integrate technology into the NHS, including the enhancement this can provide to patient care. In primary care dentistry, electronic record keeping is well established in the UK. There is sparse literature or reported outcomes on the use of electronic record keeping in dental departments in secondary care. The Royal National Ear, Nose and Throat and Eastman Dental Hospitals is now a fully digitised hospital through the introduction of Epic, a fully integrated electronic health record. We explore the role of electronic record keeping in primary and secondary care dental practice, the benefits to patient care and the challenges presented when implementing an electronic health record. We consider the benefits and challenges in digitising a centrally-based specialist teaching dental hospital, including specific features of Epic, which provide enhanced user accessibility and applications for general use and specialised services, including research and public health surveillance.

Introduction

The NHS Five year forward view, published in October 2014, presented the need to ‘exploit the information revolution’ as part of a five-year plan to address deficiencies identified in care and quality, funding, efficiency and health and wellbeing.1 Previous attempts to introduce an electronic health record (EHR) were unsuccessful, including the National Programme for IT 2002–2011 led by the Department of Health which was abandoned, with costs, delays and poor management attributing to the project failure.2 In 2016, the Secretary for Health announced a £4 billion reservation for digital and technology development in the NHS, with £1.8 billion to meet a paperless health service target by 2018.3

This government proposal to introduce an EHR system in England was later extended to 2020.4 The drive to widely integrate technology into the NHS was further presented in the NHS Long Term Plan, published by NHS England on 7 January 2019.5 This ten-year plan further echoed concerns that the current delivery of care, which has remained largely true to the service model created at the founding of the NHS in 1948, will limit evolution of health service delivery to a population with changing needs.6

Technology continues to be acknowledged as fundamental to enhancement of patient care. Such priorities include: simplicity of digital access to NHS services for patients to manage health, improved access to clinical records for clinicians and patients, use of decision support and artificial intelligence (AI) to support application of best practice and elimination of unwarranted variation across the whole care pathway.7

The current global public health crisis of COVID-19 has exemplified predictive digital technologies as fundamental to the management of acute health crises. Communication between trusts has enabled timely escalation of COVID-19-related pressure on resources and enabled relief to other sites, protecting the system from becoming overwhelmed and ensuring continued management of non-COVID-19-related conditions.

It has been a little over two years since University College London Hospital (UCLH)
underwent a major transformation to digitise the hospital, with the introduction of Epic, a fully integrated EHR. This privately-owned healthcare software, formerly known as Epic Systems Corporation, was founded in 1979 in Wisconsin, USA. This software is currently available for use in the UK, with Epic Wisdom, the specific dental module, being utilised across dental schools and units in the USA and yet to be adapted for use in the UK. According to the company, hospitals using the software included the medical records of 54% of patients in the USA and reportedly 2.5% of patients worldwide in 2015, demonstrating the company as a leading competitor in the EHR race. The company software reflects its description as ‘a glorious recounting of a nation’s events...like the Iliad or the Odyssey, our electronic health records chronicle the story of a patient’s healthcare over time.’ This vision has been successfully embraced by UCLH NHS Trust, supporting the creation of a truly complete patient clinical record, with a common EHR across all trust sites and specialties, which integrates clinical notes, imaging, lab results, referrals, prescribing and digital communication into a single system.

There is sparse literature or reported outcomes on the use of electronic record keeping in dental departments in secondary care. The procurement process in selecting Epic as the EHR for UCLH NHS Trust involved legal formality through a tendering process and unsuccessful bidders. We present the Epic software system, following its successful introduction, uniformly across the trust and the specialist Royal National Ear, Nose and Throat (RNENT) and Eastman Dental Hospitals. We discuss the benefits and challenges in digitising a centrally-based specialist teaching dental hospital, including specific features of Epic, which provide enhanced user accessibility and applications for general use and specialised services, including research and public health surveillance.

**Bridging the gap**

A health record is a set of information about the contact a person has with a health care provider. This can be paper or electronic and include various types of information, such as clinical notes, investigation results and correspondence between clinicians. In England, general practitioners (GPs) traditionally hold the most comprehensive health records for an individual. With the digitisation of primary general medical practice, patients registered with a GP in England automatically have a summary care record (SCR) created; a national digital service provided by the NHS which provides basic information about a patient’s health, including repeat prescriptions. An estimated 98% of GP practices in England use SCRs. In contrast, clinicians in the secondary care setting are less likely to have access to a patient’s full interactions with the health service and patient interaction with their information may be varied.

In primary care dentistry, electronic record keeping is well established in the UK. Software of Excellence is a familiar electronic dental software, originating in New Zealand in 1989 and introduced in the UK in 1994. Thus, digitisation of primary care dentistry is not a new emergence. The Carestream Dental R4+ system and Dentally software further exemplify the productivity of a digital record, with features such as integration of third-party applications, linking of NHS contracts and access to cloud-based services also available in addition to the basic features of clinical record keeping. Al has enabled further development of digital record keeping in dental practices, with suggested benefits for maximising service delivery. The demand for such technology is demonstrated through newer applications, including Kiroku, a note-taking app developed in 2017, ‘born out of the stress of writing endless clinical notes instead of treating patients’ with the vision that professionals should ‘not waste time on boring admin tasks.’

Notably, there is variation between software implemented in individual dental practices, which is also reflected between NHS hospital trusts. Medicine and dentistry have historically existed as separate entities, resulting in the creation of separate patient health records, which may limit patient care and safety. The General Dental Council emphasises the need to ‘make and keep contemporaneous, complete and accurate patient records’ as part of the expected standards of the dental team, with no suggested preference on paper or electronic notes. Despite offering clear advantages in primary care dental practice for efficiency, patient accessibility and financial benefit, the comparatively limited uptake of electronic records in dentistry in the secondary care setting has created barriers for patients and clinicians in delivery of evidence-based oral care.

Bridging the gap between technology and dental care, followed by integration of this with the remainder of the patient’s medical record, would provide an ultimately comprehensive record of a patient’s contact with the health service, along with the benefits of digitisation. Thus, the introduction of a fully electronic dental record in a secondary care setting and integration of this as part of a patient’s electronic medical record within an NHS trust have been two considerable and new pathways of progress for dentistry in the secondary care setting. The anticipated and emerging benefits for patient care, through the use of Epic at the RNENT and Eastman Dental Hospitals, have been substantial and provided ease of interaction between dental and medical services to support holistic patient management.

**An Epic move in patient care**

As with other EHR systems, digitisation of patient records offers common benefits, including time-efficient clinical notes and removal of issues surrounding record storage. The software-specific features of Epic, which can be tailored depending on service and speciality needs, provides users with a system that promotes high productivity and enhancement of patient care. As one of the first specialist secondary-care based dental services to be utilising Epic alongside our colleagues in medical specialities, the findings from this novel position of experience are important to share among the professional community for future considerations in the NHS digitisation.

From the clinician’s perspective, some of the greatest strengths of Epic’s EHR are the simplicity and accessibility to view the patient’s past contact with other specialities and sites within the trust and compiling different data sources, including imaging, letters and consultation notes. A multidisciplinary approach is streamlined through instantaneous and simultaneous access to records and imaging, even with clinicians in different sites or specialities, with team members able to instantly communicate with each other via the Inbasket Message feature and provide input to the patient’s care in a secure, confidential and reliable fashion. The ability to search through historical clinical records with keywords facilitates greater efficiency of time and effort in contrast to the practices of paper-based notes, which can often be poorly-ordered and with illegible entries. With each patient contact with
the trust, each entry into Epic contributes to the creation of complete, chronological, clinical records in the time pressured environment of a busy, clinical department. The use of Smartphrases to provide the framework of clinical notes can act as an aid memoir for clinicians, reducing variability of recorded assessments within a department and providing a more time-efficient means of record keeping compared to handwritten notes. Smartphrases also support identification of patients requiring specific pathways of care. In oral surgery, a consultant-led compilation of a Smartphrase for patients at risk of medication-related osteonecrosis of the jaw provides a clear guide to assessing the presenting patient risk and an appropriate management regime, such as the use of antibiotics, which all levels of the team can utilise and provides a clear, comprehensive method of recording this in the records. The drug prescribing feature within Epic is designed to reduce safety incidents, with patient allergies and health conditions highlighted and potential contraindications or interactions presented to the clinician in real-time. Verification and authorisation features provide an additional safety step and can be useful when used with junior trainees who may be unfamiliar with some aspects of drug prescribing, with the option of introducing a co-signature a further feature. Mobile, tablet and remote access to Epic provide a secure access for clinicians to work off-site. This has been particularly useful for out-of-hours care, where alongside all the features described, patient imaging, clinical notes and test results can be reviewed in real time and entries can be made into the clinical notes off-site, for example, if providing a non-resident on-call cover.

Digital record keeping provides several direct benefits to patient care, such as the integration of patient accessible applications within Epic’s record keeping system. MyChart, an application powered by Epic, provides patients with enhanced accessibility to their health information and access to their clinical team. The features provided by MyChart include access to your health record, the ability to remotely request copies of your health record, access to information on who has viewed your health record and the ability to authorise the sharing of your health record with other organisations or providers. Patients can view and update their health information including medications and allergies, view test results and obtain instant digital copies of correspondence, once they have been electronically authorised by the clinician. These features empower patients to manage their health, with the ability to track and initiate appointments based on their symptoms and perception of severity, which can also provide valuable information for clinicians triaging referrals. The message centre feature provides instant communication between patients and the organisation, with patients able to request repeat prescriptions, patient-initiated follow-up appointments and sick notes, providing convenience for patients and a track-record of communication stored in Epic of such encounters under the EHR. This feature provides a secure method of communication to the clinical team, bypassing phone lines and waiting times to access the relevant member of the team. The simplicity of using MyChart on demand has allowed patients to continue accessing health services, even for those with limited digital literacy. This has supported the delivery of remote consultations during the COVID-19 pandemic, reducing footfall within the hospital and preserving face-to-face contact for those with urgent clinical needs. Importantly, video-consulting and secure messaging features are accessible through Epic without the need for a third-party application, where reliance on link sharing and passcodes often leads to confusion and delays in communication.

Data retrieval is simplified with electronic records stored in Epic, providing ease and efficiency for audits and quality improvement. The labour- and time-intensive process of capturing and analysing data from individual clinical records is eliminated as data fields are searchable and retrievable with minimal effort, allowing rapid data capture of large sample sizes. Large volumes of data can be stored for the legally required period of time and beyond, with minimal physical space requirements and necessity for staff. It is also possible to restrict the procedures or actions of individual staff members in accordance with their scope of practice and trust policies.

From a medicolegal perspective, electronic record keeping and patient management systems offer greater security owing to intrinsic traceability and transparency. For example, digital timestamps of check-in and check-out times can provide evidence of attendance and reflect the nature of an appointment. A claim of ‘extensive discussions’ can be supported or undermined by the metadata attached to the encounter in question and provide a legal team with vital information in cases where a lack of traditional evidence hampers a strong defence.

The environmental impact of dentistry and the wider healthcare industry is under increasing scrutiny, with pressure to adopt more sustainable ways of working. Digitisation significantly reduces the need for paper consumption and more importantly, the transport and long-term storage of records.

The challenges of change

Within the benefits of employing an EHR such as Epic, numerous challenges remain to its adoption and use. Financial considerations reach far beyond the cost of the software and must take into account myriad factors, including network infrastructure, hardware requirements, troubleshooting support, potential downtime issues and porting of data, either from paper-based sources or different electronic systems. The initial setup also raises the issue of staff training and compliance, a barrier which can be difficult to overcome and relies heavily on positive engagement and periodic hands-on training, all of which consume energy, fiscal cost and clinical time. The requirement for a certain level of technological skills may present difficulties in adapting to an entirely new method of working, with some staff requiring greater support than others. When there is the potential for significant portions of the clinical notes to be prepopulated, the risk of inaccuracy and inadequate tailoring of records to the clinical scenario can arise. Furthermore, a degree of dependence can develop, where downtime can leave clinicians feeling temporarily paralysed and unable to adapt to unforeseen circumstances.

A matter of governance

Objective measuring of the impact of introducing an EHR in the dental hospital provided an important means of reflective practice to assess how the transition from paper notes to Epic has influenced clinician behaviour and ultimately, patient care. A retrospective audit was conducted on the quality of record keeping using electronic records in the oral surgery department at the RNENT and Eastman Dental Hospitals. Data was collected over a one-month period in July 2020 from 100 randomly selected patient records chronicled and stored on Epic. Data was compared against a previous audit cycle completed in 2018, during which a solely paper-based record keeping system was employed.
was analysed in isolation. This audit helped to identify Smartphrases or prompts, as well as further training and guides to produce more comprehensive notes and shall be re-audited regularly to keep the system evolving.

A digital future

In this digital era, where we expect instant responses and access to information on demand, patient interactions and involvement with their health and associated data have evolved and the health service needs to keep up with this. Yet, it is feasible that, on the back of practical priorities, changing patient needs and technological advancements, it was the COVID-19 pandemic that ultimately accelerated the move to a more digital NHS, where rapid access to public health data continues to prove essential in numerous areas, including disease surveillance, mortality and morbidity monitoring, vaccination delivery and for research purposes.

Transformation to a digital hospital is now a successful reality at UCLH. We hope this paper will provide greater understanding for service providers to consider its use to improve clinical services and patient care.

Ethics declaration

The authors declare no conflicts of interest.

Author contributions

Jaspreet Virdee was substantially involved in drafting and writing the manuscript and approved the final version of manuscript. Ishita Thakrar supported writing the manuscript. Rupa Shah led data collection and analysis of results (for record keeping audit at Royal National ENT and Eastman Dental Hospitals) and supported writing the manuscript. Sonita Koshal conceptualised the manuscript and approved the final version of manuscript.

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