



A Comparison of Approaches to Electronic Health Record Sharing in the State of Qatar and the United Kingdom.

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Abstract

Background: Records are an integral part of every aspect of patient care and the efficient communication of clinical data between Primary, Secondary and Tertiary services is vital. This article compares the different approaches to sharing of electronic health records (EHRs) employed in the State of Qatar and the United Kingdom. **Method:** Utilising publicly available government policy documents we note how the differing approaches to the sharing of EHRs arose in the State of Qatar and the United Kingdom and the underlying technology involved. **Results and discussion:** In the context of the technology involved we discover the advantage of Qatar's centralised patient record model over the UK decentralised system, discuss how this is achieved and look into potential advantages of implementing an industry standard for exporting and importing EHRs to and from external sources via the common coding system used in both countries. **Conclusion:** The sharing of EHRs between Primary and Secondary health care in Qatar implemented as part of its National Health Strategy provides clear benefits to both Primary and Secondary care physicians in instant access compared to the more fragmented slower approach in the UK. Further research into utilising the SNOWMED CT data encoding system to provide a means of sharing patient data across proprietary systems is suggested.

Keywords: electronic health records, technology, SNOWMED CT, National Health Strategy, sharing, Data Protection Act



ملخص الدراسة:

الخلفية: تعد السجلات جزءًا لا يتجزأ من كل جانب من جوانب رعاية المرضى ، كما أن الاتصال الفعال للبيانات السريرية بين الخدمات الأولية والثانوية والثالثية أمر حيوي. تقارن هذه المقالة بين الأساليب المختلفة لمشاركة السجلات الصحية الإلكترونية (EHRs) المستخدمة في دولة قطر والمملكة المتحدة. الطريقة: باستخدام وثائق السياسة الحكومية المتاحة للجمهور ، نلاحظ كيف نشأت المقاربات المختلفة لمشاركة السجلات الصحية الإلكترونية في دولة قطر والمملكة المتحدة والتكنولوجيا الأساسية المستخدمة. النتائج والمناقشة: في سياق التكنولوجيا المعنية ، نكتشف ميزة نموذج سجل المريض المركزي في قطر على النظام اللامركزي في المملكة المتحدة ، ونناقش كيفية تحقيق ذلك وننظر في المزايا المحتملة لتطبيق معيار صناعي لتصدير واستيراد السجلات الصحية الإلكترونية من وإلى مصادر خارجية عبر نظام الترميز المشترك المستخدم في كلا البلدين. الخلاصة: توفر مشاركة السجلات الصحية الإلكترونية بين الرعاية الصحية الأولية والثانوية في قطر والتي يتم تنفيذها كجزء من استراتيجيتها الوطنية للصحة فوائد واضحة لأطباء الرعاية الأولية والثانوية في الوصول الفوري مقارنة بالنهج الأكثر تجزئة الأبطأ في المملكة المتحدة. يُقترح إجراء مزيد من الأبحاث حول استخدام نظام ترميز بيانات SNOWMED CT لتوفير وسيلة لمشاركة بيانات المريض عبر أنظمة الملكية.

Introduction

Before the advent of the National Health Service (NHS) a government funded health care service in the United Kingdom (UK), the health system was primarily provided by individual private sector organisations. Although private healthcare providers exist in Qatar, historically the public health service has never existed separate from the government but been part of a long-term plan for the country's future as part of its National Health Strategy. Both countries utilise sophisticated EHR systems to integrate patient care in Primary and Secondary services. The purpose of this paper is to form a deeper understanding of the technology used in EHRs, and to underline the importance of the availability of patient data across Primary and Secondary care systems by seeing how this is approached in these two different countries.

Method

We will initially look at the organisational differences between the two countries using publicly available policy documentation with a view to understanding how these have affected their approaches to the implementation of EHR sharing. We then describe the underlying technology and medical coding system utilised by both countries and suggest a means of utilizing the underlying technology that might warrant future research or implementation.



Discussion

The organisational structure of the UK's National Health Service (NHS):

To a UK patient, the NHS appears to be one organisation however this is not the case internally. Many separate organisations exist under the NHS banner providing its different functions. The UK Government's Department of Health and Social Care relies on National Health Service England, a non-departmental public body (NDPB) to oversee the commissioning of both Primary, Secondary and community health services. Public Health England (another NDPB) provides public health services and yet another NDPB, the Health and Social Care Information Centre more commonly known as NHS Digital is responsible for "the Spine" which is the Information Technology (IT) infrastructure of the NHS. This joins together over 23,000 healthcare IT systems in 20,500 organisations (Department of health and social care, 2014).

NHS England directly funds Primary care, Dentistry and Secondary care specialist services. It utilises Clinical Commissioning Groups (CCGs) in different geographical regions of the UK to commission Secondary care and Community services which may be provided by private organisations contracted to provide NHS services. All these need access to patient data on a varying level and despite leaving the European Union, all patient data stored in the UK is subject to the European General Data Protection Regulation covering the storage, use and transmission of personal data which is enshrined in UK law under the Data Protection Act 2018 (Data Protection act, C 12, 2018).

An important point to note is that most of the NHS primary health care function such as General Practice is provided by separate private organisations with independent contractor status who are not direct employees of the NHS (Primary Care Strategy and NHS Contracts Group, 2020). Services at such Primary care facilities will widely vary depending on the size of the organisation. Although overseen by NHS England and subject to the data protection act above and provided their IT infrastructure services by NHS digital, such centres can independently choose whatever EHR system they feel appropriate for their needs. It is common practice to utilise a single EHR software system when the organisation provides care over several sites, but there is no requirement in law to do this.



Via the spine, medical records can be transferred from different Primary health care systems but due to the variety of EHR systems employed the time this takes can be variable and they would not be instantly available to a clinician.

Acute hospital trusts in the UK are not independent organisations from the NHS. One might thus expect them to have a more uniform approach to sharing EHRs, however this is not the case. A recent study revealed an obstacle in EHR sharing in that of 152 such trusts surveyed 35 (23.0%) were still using paper records. In the remaining 117 trusts that did use EHRs 92 (78.6%) were using one of 21 different EHR vendor systems, 12 (10.3%) were using multiple different EHR systems and 13 (11.1%) were using ‘in-house’ developed software (Warren, 2019).

Surprisingly then for what appears to the UK patient to be an integrated service, the variation of differing software used in maintaining EHRs is similar to that which can be seen in a much bigger country such as India, in which there are some 380 or more software producers albeit usage of such EHR software in India is still relatively low compared to the UK (Davey, 2015).

The organisational structure of health services in the State of Qatar:

Compared to the organisational structure of the NHS in the UK, the State of Qatar is comparably less complex. Certainly, there is a comparable hierarchical structure in that the overall responsibility for the nation’s health falls to the Supreme Council of Health (SCH) which was established by His Highness the Emir in 2005. The National health strategy is defined by the Ministry of Public Health. Operationally speaking however, medical services are essentially provided under the auspices of two main organisations: Primary Health Care Corporation (PHCC) and Hamad Medical Corporation (HMC).

PHCC, being independent from HMC since 2012 has been responsible for delivery of primary care in Qatar comprising of around 26 Health centres at the time of writing. These centres provide a more uniform service compared to the UK. These include Family Medicine Clinics, Cardiology, ENT, Ophthalmology, and Dentistry varying dependant on the centre. Each health centre has the facility to refer to another if it does not have the specific clinic or facility on site. Other more standard services provided in most sites include Radiology, Laboratory and Pharmacy.



The provider for Primary, Secondary and Tertiary healthcare falls under the HMC. Established in 1982 HMC oversees multiple facilities examples of which are Al Wakra Hospital and Hamad General Hospital. Hamad Medical Corporation also has academic links with Qatar University, Sidra Medical and Research Centre, Weill Cornell Medical College and the Qatar Biomedical Research Institute.

Driven by the directive in the 2011-2016 National Health Strategy by the Ministry of Public Health, “facilitated sharing of health data between different providers and contributed to a more integrated health system” (State of Qatar Ministry of Public Health, 2018) Primary and Secondary care in Qatar enjoy the use of the same patient management system for EHRs and therefore access between centres and hospitals is instant. No issues with multiple vendors or systems.

So as seen above, in the UK each individual health centre and hospital can be considered for practical purposes to hold a separate database of EHRs, where there is only one central database for EHRs in Qatar. EHRs in Qatar are immediately available once committed to the database where access from different sights can be slow or simply not available electronically. This is a significant difference between the two healthcare services’ approach to EHR storage and access. The advantage to physicians in Qatar is having instant access to medical history of the patient in front of them in an acute clinical scenario very clearly. In the UK, it can take hours or days in some cases to retrieve the same information due to the fragmented nature of the UK system.

Components of the electronic health record

In this section we will look at some of the underlying concepts behind electronic patient records so the potential benefits may be understood in the context of how the technology works.

The three-tier system – the right information to the right people:

Medical Information systems as described above can be considered in three tier systems (N. Panwar, 2016). The below is a simplification and only intended to illustrate the basic concepts. The tiers in our example comprise of the presentation tier, the logic tier and the data storage tier. The presentation tier is the interface through which data is entered and viewed by the user.



The logic tier governs access to this data and performs some processing for the presentation tier such as highlighting results. The data storage tier ensures safe storage and relevant retrieval depending on the needs of the user.

Qualitative and quantitative medical data is validated and encoded at the presentation tier so it can be stored in a usable form at the database for later retrieval e.g. manually entered blood pressure readings checked for range. After making a clinical diagnosis based on this retrieved data, a diagnosis of hypertension might be entered. This clinical diagnosis could then be represented as a past medical history.

As stated above, the logic tier can dictate how stored data is presented and restrict access to authorised users.

The storage tier is usually a relational database which can link records in categories such as lab trends for a specific patient or can be retrieved for a patient group e.g. average systolic blood pressure in diabetics at a health centre.

SNOMED CT – speaking the same language:

SNOWMED CT is an electronic standard for health information exchange in around 50 countries including Qatar and the UK (Dennis Lee, 2013). It provides a structured clinical vocabulary to store health data such as diagnosis and test results allowing data to be shared across different health systems. Using a standard means of encoding data such as this has implications in how we can share such data as will become clear below but let us first compare some of the practical differences between the presentation layers used in Qatar and the UK.

Comparison of the EHR entry in the UK and Qatar

	UK	Qatar
Presentation layer aspect	System One TPP	PowerChart Cerner
Template systems to format data	Yes	Yes
Encoding system	SNOWMED CT	SNOWMED CT
Record sharing across health centres	Delayed	Instant
Electronic medication order	Across Spine (variable)	Country Wide



The above table represents a comparison of a typical Primary care system used in the UK compared to that of Qatar. PowerChart, a Citrix web-based technology is used in Qatar whereas a more complex Java client (or similar) is used in the UK. This advantage of the complex client is that it will take responsibility away from the user for updating the screen but is likely to need reinstalling more regularly when updates occur to the system. Both systems support SNOWMED CT encoding and template type entries to simplify data entry, but only the Qatari system can instantly share that data with other health centres or hospitals. Electronic dispensing is available on both systems but stock availability feedback in the UK will depend on ownership of the Pharmacy and local laws.

Implement an industry standard for data transfer

As we have seen both countries' systems use SNOWMED CT for coding data which is widely implemented across the globe. It is common for patients in both the UK and Qatar to attend private hospitals or have medical records from abroad. In view of this it would be sensible to try and include such data to facilitate continuity of care from external proprietary EHR systems. This could be achieved by developing an industry standard for data exchange interface based on the SNOWMED CT lexicon. This would allow external healthcare systems to exchange standardised EHRs to and from the remote proprietary systems to local records. The potential benefits of having such an industry standard for EHR transfer are suggested below:

- Importing verified summary data such as vaccination, diagnosis and regular medicines to local records thus reducing the risk of transcription errors.
- Local drug/vaccination requirements could be forward planned based on imported data.
- Visibility of externally taken investigations such as MRI, CT, Ultrasound for the purposes of continuity of care, disease management or research.
- Externally made diagnosis and prescribed medications could be checked against for contraindications and interactions on drugs prescribed at local health centres and hospitals.
- External diagnosis made in private facilities could be added to records for public health data.



Conclusion

Qatar's National Health Strategy has produced a large amount of innovation in terms of implementing the EHR in a relatively short period of time. The use of a single database has put its healthcare service in a desirable position in terms of continuity of care between different Primary care centres and Secondary Care services. Both Primary and Secondary care records are instantly available thus aiding physicians to make decisions in an acute or routine setting.

Due to the various factors described in this paper such as varied systems and organisation structure, the UK is unfortunately trailing behind in terms of EHR sharing between Primary and Secondary care. The use of the international SNOWMED CT standard is the underlying technology used for EHRs in both countries. Further potential includes innovation such as, acquisition of patient data from external health care providers such as private clinics or overseas healthcare records by agreeing an industry standard for data exchange for EHRs, imaging and other investigative data.

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