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Digitalised Health Records: Does Malaysia Need It?

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Introduction

Malaysia, like many countries globally, faces a demographic transition into an ageing population burdened with non-communicable diseases (NCDs) resulting in a nation with increasing care needs. By 2040, Malaysia is expected to become an aged nation with citizens aged 65 years and above making up more than 14% of the total population[1]. This phenomenon of ageing comes paired with an accumulation of health conditions[2], exacting a taxing cost on the country[3].

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[1] DOS (2022); OECD and World Health Organization (2020)
[2] Gyasi and Phillips (2020); Chan et al. (2022)
[3] MOH and WHO (2020); (2022); The Star (2022)

The World Health Organisation (WHO), amongst others, has called for transformations in healthcare provision in order to combat this increasing burden of disease[4]. This includes highlighting the need for digital solutions as a crucial tool to create a healthcare system that is more community-based, provides lifelong, regular support and places more emphasis on preventive care. An example of such innovation is through the digitalisation of health records, which will be discussed further in this article.

What are digitalised health records (DHRs)?

Traditionally, any patient information is recorded in a physical, paper-based medical record. This record may include any medical history, presenting symptoms and observations from the healthcare practitioner. However, there are issues with physical records such as the need for significant storage space, reliability of retrieval and transfer of records between providers, information safety as well as increased tendency for loss or destruction. This has triggered a global movement to switch towards digitalisation of these medical records such as seen in Singapore and Australia[5].

DHRs is an umbrella term that encompasses several different methods of record digitalisation[6]. The most commonly used terms include electronic medical records (EMR), electronic health records (EHR) and patient health record (PHR). The definitions of each term are summarised in Table 1 below. This article will use the term DHR to refer to the overall effort of digitalising patient health records.

Table 1: Commonly used terms under the DHR umbrella

Terminology	Electronic medical record (EMR)	Electronic health record (EHR)	Personal health record (PHR)
General description	A digital version of a clinician's chart, meant to be used within a single practice and limited to use within a single facility.	A digital, longitudinal record of patient health that can be shared between multiple healthcare providers (HCPs) and facilities	A digital collection of patient medical history that resides with and is managed by the patient themselves, usually in a personally owned device.
Sharing across multiple healthcare providers	No	Yes	No, but patients can share information from their own devices
Longitudinal tracking[7] of patient journey	No, unless patient attends same facility throughout lifetime	Yes	Yes
HCP-managed	Yes	Yes	Yes
Patient-managed	No	No	Yes

Source: Heart, Ben-Assuli and Shabtai (2017); Garrett and Seidman (2011); Bouayad, Ialynytchev and Padmanabhan (2017); Ilyana (2021)

[4] WHO (2019)

[5] Honavar (2020)

[6] It should be noted that there is a difference between digitisation and digitalisation. Digitisation is simply the process of converting something from paper to digital format, however digitalisation involves the transformation of processes to become more automated using digital technology (further elaboration on this can be read in KRI's #NetworkedNation: Navigating Challenges, Realising Opportunities of Digital Transformation).

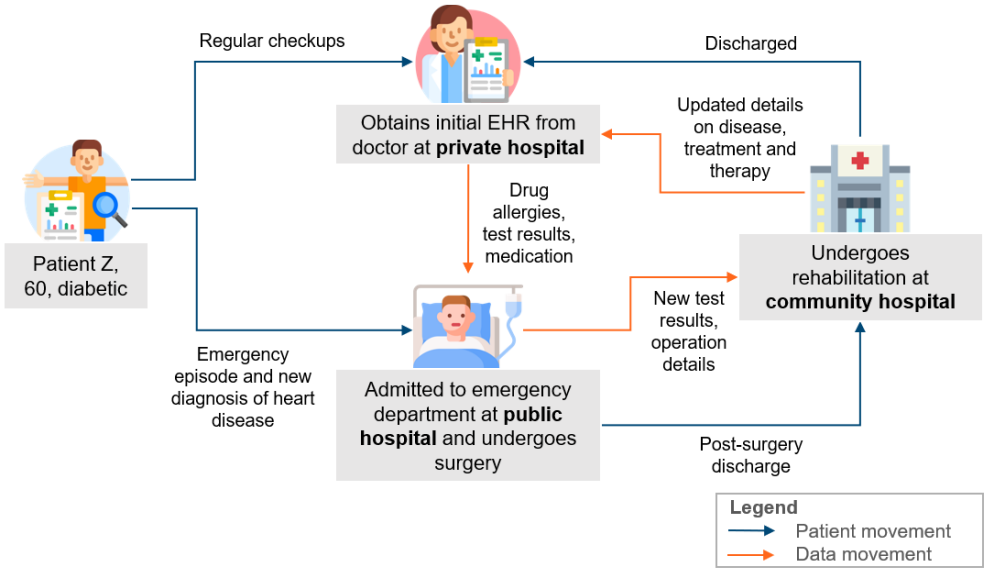
[7] Longitudinal tracking involves the compilation of an individual's health data across their whole lifetime and includes information from every visit to a HCP such as care treatment plan, medication and allergies.

Setting the Scene: What Would an Ideal DHR System Look Like?

In Malaysia specifically, the government envisions a lifetime health record (LHR), a digital tool that would allow HCPs to access health data stored in multiple, dispersed locations. The description of LHRs is similar to that of EHRs and indicates that the government's goal is to ultimately establish an EHR system, which is the ideal goal digitalising health records[8]. The reason that EHRs are a better solution than EMRs is that EHRs more accurately mimic a typical patient's movement throughout the healthcare landscape. EHRs allow information to be gathered as the patient visits primary care facilities for their regular check-ups as well as larger hospitals for episodic treatment[9].

A descriptive illustration can be seen in Figure 1 below using Patient Z as an example of a 60 year old diabetic man. On a regular basis, Patient Z would attend check-ups to monitor his average blood sugar levels and overall health status at a private hospital or alternatively a primary care facility (*klinik kesihatan (KK)*) in Malaysia. With an EHR system in place, all Patient Z's health information such as his primary diagnosis, allergies, test results, treatment plan or current medication would be digitally recorded and updated with each check-up. This information is automatically uploaded into a centralised database, a key hallmark of an EHR system.

Figure 1 Example of patient data movement throughout the patient journey with EHR implementation



Source: Adapted from Lai (2017)

[8] Ilyana Mukhriz (2021); MOH (2022)
[9] Ilyana Mukhriz (2021)

In the event that Patient Z experiences a health episode which requires emergency admittance into a public hospital, doctors in the emergency department at the new facility he is brought to are able to access his health information through the aforementioned database. Not only will this allow the emergency healthcare providers to understand Patient Z's medical history, they will also be able to update his record with new diagnoses and treatment details. Thus, when Patient Z is eventually discharged to either a rehabilitation centre or back to his default KK, healthcare providers at each facility are immediately aware of his current health status.

The Potential Benefits of DHRs

The seamless sharing of patient health information to provide a comprehensive and longitudinal record of a patient's medical history holds the potential to significantly improve the quality of individual clinical care. This is in addition to improving the overall health of the population.

EHRs enable continuity of care for individuals

As described earlier, having an EHR system in place allowed Patient Z to receive continuous, uninterrupted care regardless of which facility he was receiving care from. The importance of providing continuous and accessible routine care, requiring seamless flow of patient health information at each point of care, becomes more evident in the face of an ageing population burdened with NCDs.

An EHR system could be a potential solution for effective at-home disease management that will allow gradual shifting of care burden away from the healthcare sector. Patients with chronic health conditions, especially the elderly, can have problems following treatment regimens and require support to encourage self-management of disease. In fact, a Malaysia-specific study found that 46.6% of patients with hypertension had poor medicinal adherence, with many missing medication doses due to forgetfulness[10]. EHRs would act as a foundation for future systems such as online portals, mobile applications or SMS-based systems with intuitive reminders on medications as well as follow-up appointments[11]. However, while more complex systems are being built to deliver these functions, simply providing patients and their caregivers with access to their health information would already allow those with chronic conditions to be aware of their latest health status and the medications being prescribed to them.

[10] Ramli, Ahmad, and Paraidathathu (2012)
[11] Nazihah and Ilyana Syafiqa (2021)

This health awareness promoted through EHRs aids in the active self-management of disease by patients in conjunction with health providers and caregivers. Based on a US study on patients over 65 years old, providing access to personal health information and clinical notes promoted better adherence to treatment plans and medications[12]. Also, in elderly care homes in Australia, the implementation of EHRs was found to ease access to care, ensure that caretakers were more informed about the needs of the residents and facilitate communication with external healthcare providers[13].

Importantly, in the face of a health crisis, a digital database that is seamlessly shared between healthcare providers allows patients to receive continuous care even when their regular healthcare facility becomes overcrowded or inaccessible. Patients would have the option of attending online consultations or receive in-person care appointments in alternative facilities since, through their EHR, their information is available to anyone providing care[14].

As seen with Covid-19, the implementation of a nationwide lockdown and increasing congestion at healthcare facilitites in Malaysia meant that patients were directed to have phone and email consultations or receive care from the nearest major hospitals[15]. A local study found that for adolescents with type 2 diabetes mellitus (T2DM) the prolonged lockdown led to worsening of control of their blood sugar level[16]. This meant that there was a need for continued support and access to healthcare professionals which would be better enabled with EHRs.

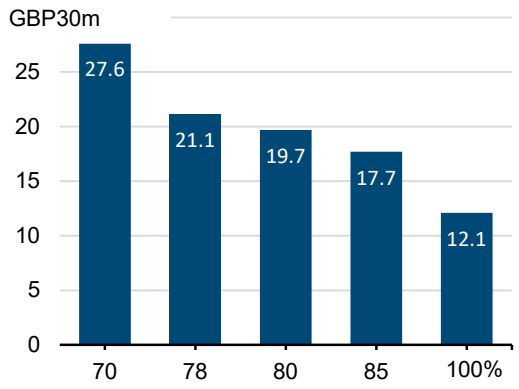
EHRs improve preventive healthcare for the population

Since the Covid-19 pandemic, there have been calls for a reformation of the healthcare system to move away from curative care services and instead focus on long-term preventive care services. This includes increasing health awareness among Malaysian and encouraging them to take control of their health through voluntary behavioural changes[17]. During the 2022 Health Policy Summit where a Health White Paper for Malaysia was launched, there was mention of a digital system facilitating patient flows among healthcare providers to ensure optimised use of healthcare resources[18]. Although it was referred to as an EMR, the description better fits that of an EHR.

[12] DesRoches et al. (n.d.)
[13] Zhang, Yu, and Shen (2012)
[14] OECD (2021)
[15] Cheng et al. (2021)
[16] Cheng et al. (2021)
[17] Ilyana Mukhriz, Teoh Ai Ni, and Puteri Marjan Megat Muzafar (2022)
[18] Khairy Jamaluddin (2022)

One of the ways EHRs could benefit the effort to provide preventive care is by acting as a comprehensive patient registry that allows for efficient targeting of populations eligible for healthcare screening[20]. Screening, and appropriate follow up treatment regimens, can result in disease prevention in at-risk groups, with detection of disease at earlier stages being relatively easier and less expensive to treat[21]. Based on a study conducted by a cross-party think tank based in the United Kingdom (UK), if screening coverage was increased to cover all eligible women in the country, a savings of GBP9 million annually could be achieved by the government. Conversely, an 8.3% decrease in screening coverage for cervical cancer could result in an increased cost to the healthcare system by GBP6.5 million per year (Figure 2). These costs were projected to have greater increases in later stage cancers.

Figure 2 Estimated annual cost of cervical cancer to the NHS according to screening coverage for women aged 25-64[19], 2014



Source: Demos (2014)

According to the National Health and Morbidity Survey 2019 (NHMS 2019), Malaysia faces a worryingly low uptake of screening programmes which results in cancers being detected at later stages and incurring substantial costs. For example, cervical cancer and breast cancer screening coverage within eligible groups is only at 36.3% and 21% respectively. Malaysia has actually failed to meet at least 50% screening coverage for three main cancer types highlighted by the NHMS[22].

In Denmark and the UK, having a comprehensive registry enabled screening processes to be automated and resulted in a decrease in incidence of cancers such as cervical cancer[23]. For example, the UK's Cervical Screening Programme automatically sends mailed invitations to attend screening to women once they reach the age of 24.5. These invitations are also subsequently sent again periodically throughout the woman's lifetime[24].

[19] These costs to the NHS for different screening rates were modelled by Demos based on the cost of treatment for women at different stages of cervical cancer and ages in the UK based on cost references for 2012/2013.
[20] Nazihah and Ilyana Syafiqa (2021)
[21] Iragorri and Spackman (2018)
[22] Nazihah and Ilyana Syafiqa (2021)
[23] Bchtawi et al. (2019); Labeit, Peinemann, and Kedir (2013); Nazihah and Ilyana Syafiqa (2021)
[24] UK Government (2021)

EHR implementation, which facilitates the automation of screening reminders and recruitment of screening participants, could potentially boost screening coverage and increase awareness among the local population. This potential is illustrated through the implementation of an EHR-based cancer screening programme in China's Minhang district where residents are provided with a medical care card containing all their medical records. These records are accessible by all healthcare providers within the district. Since healthcare providers were able to record and access patient information each time a patient received care, they were able to deliver targeted health education courses, enlist at-risk groups for free health check-ups and conduct opportunistic screening. A district level study found that EHR-based cancer screening made up 13.3% of all newly diagnosed cancers in Minhang and successfully detected 30.7% of cancer cases in early stages. Importantly, patients detected through this programme were managed at a cost of only 10% of the allocated annual public health budget[25].

Conclusion

This article has discussed the benefits of an ideal system where patient records are digitalised but does not touch on issues related to the overall implementation of DHRs, which will be discussed in a future publication.

Ultimately, innovations are much needed to create a resilient healthcare system that is able to cater to the evolving needs of the population. A reliance on traditional paper-based methods could be potentially detrimental as patients shift from requiring episodic, curative care to long-term continuous care that is increasingly community-based. As such, DHRs that allow seamless sharing of information between healthcare providers and easy patient access to medical records is something that should be implemented. Investments in digitalisation for healthcare should focus on solutions that can benefit the whole population and can serve as a foundation for further adoption of digital health technologies.

[25] He et al. (2019); Nazihah and Ilyana Syafiqa (2021)

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