Electronic Health Record can Better Support Primary Care in Mongolia

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Many developed countries such as the United States, UK, Canada, and Australia are implementing a nationwide electronic health record (EHR) as a core component of their national health information system. Several studies have reported its effectiveness in improving population health and saving national health expenditures [1]. Realizing this potential will require understanding what EHRs can realistically offer to improve population health, the requirements for obtaining useful information from EHRs, and a plan for addressing these requirements. EHR and electronic medical record (EMR) are similar concepts, but there are some differences. While EMR has been introduced in several other Mongolian hospitals, including the Mongolian National University of Medical Sciences hospital, EHR is still new and not well known to many health professionals. EHR is defined as a more longitudinal collection of the electronic health information of individual patients or populations from birth to death. EMR is, in contrast, defined as the patient record created by providers for specific encounters in hospitals and can serve as a data source for an EHR [1]. EHR is patient centric and shared across different healthcare settings, whereas EMR is provider centric and episodic.

Use of EHR can greatly contribute to improved primary healthcare in Mongolia because many of family health centers do not have adequate paper-based medical records or EMR. EHR can be used to facilitate referral communication between primary care providers in family health center and specialists in secondary or tertiary hospitals [2]. To better support primary care in Mongolia, the Center for Health Development, in collaboration with WHO, has launched a project to develop EHR in April, 2016.

Many studies have supported that primary care extends life span, reduces morbidity, increases patient satisfaction, and is cost effective [3]. It is also where most people receive care. The Institute of Medicine (IOM) defines primary care as 'the provision of integrated, accessible health care services by clinicians who are accountable for addressing a large majority of personal health needs, developing a sustained partnership with patients, and practicing in the context of family and community.' Primary care is the logical foundation of an effective health care system because it can address the large majority of health problems in the population. The IOM identified seven attributes that characterize primary care: accessibility, coordination, sustained care, comprehensiveness, partnership with patients, person-centered, and integration [4]. To hold the promise of improved care in Mongolia, EHR should support these primary care attributes.

Accessibility: To increase accessibility, EHRs need to reduce documentation burden, help clinicians and health workers move beyond visits to deliver care, and allow them to evaluate, monitor, and improve accessibility [4]. EHR should have a capability to aggregate and accept structured clinical data from other external sources (e.g. other hospital's EMR) to reduce documentation workload and allow the clinician to be fully present for the patient. In addition, EHR has an ability to transmit health information for referral to other hospitals.

Coordination: Clinicians need EHRs that can coordinate and track care delivery across all clinical settings. This requires the creation and use of information exchanges, an important prerequisite for coordinating care. To have this functionality, EHR needs to adopt standard data exchange protocol (e.g. HL7), disease coding systems (e.g. ICD 10), and vocabularies (e.g. UMLS, SNOMED); clinicians need to adopt standardized methods for recording and tracking patient data [5]. Clinicians and managers also need a dashboard that synthesizes and prioritizes information across communities and settings to clearly show disease patterns and what has happened to patients in communities. In the EHR project, open-source software called DHIS2 (District Health Information System) was used to develop a dashboard for community planning. DHIS2 is a comprehensive health information system developed by the University of Oslo for reporting and analyzing needs of district health administrations and health facilities at every level [6]. It is designed to provide comprehensive information to support the information needs of the different levels of health systems - national, regions, districts, and facilities. DHIS2 can provide a dashboard to improve coordination and integration of primary health services.

Sustained care: To promote sustained care, EHR needs to generate reminders and disease registries. More is needed to promote both continuity and longitudinally. Continuity requires establishing and defining relationships, tracking how well relationships are maintained. EHR needs to provide the capacity to view episodes of care and display the chronological progression of signs and symptoms [5]. For chronic disease management, EHR can make it easy, within the same graphic representation, to see a timeline of laboratory results, medication changes, and symptom/disease evolution. In the EHR project, the m-Health (or mobile health) module with portable devices was developed in collaboration with WHO to support such EHR function. M-Health is a medical and public health practice supported by mobile devices, such as mobile phones, patient monitoring devices, and other wireless devices [7]. Since October 1, 2016, the m-Health system for visiting home services

has been developed and implemented at six family health centers in Mongolia (two Songino Khairhan District family health centers and three Umnugobi Aimag's Soum health centers). Three portable devices (ultra-sound, ECG, and blood pressure measurement) were integrated with the Samsung Galaxy Tab for easy capture of graphic images from patient homes. These images can be transmitted to the EHR for patient referral and medical consultation to secondary hospitals.

Comprehensiveness: Primary care addresses the entire health spectrum and will need EHR with more robust decision support to address prevention, acute care, and chronic care [8]. EHR needs to provide wide spectrum of information to support primary care such as: vaccination, physical exam, lifestyle, and screening for prevention; progress note for acute care; and chronic registry for chronic care.

Person-centered: An understanding of the patient is central to creating long-term partnerships. Merely recording demographics and family history does not support addressing whole-person care in the context of family and community [9]. A person-centered summary, or comprehensive 'patient profile,' should be available in the EHR.

Partnership with patients: Care needs to be tailored to everyone through shared decision-making and patient engagement. EHR should capture and document a patient's readiness to change unhealthy behaviors and appropriately provide materials to clinicians, patients, and families to better motivate and support change [10]. To change personal, unhealthy behavior and promote health, EHR should provide lifestyle information (e.g. smoking, drinking, diet, and exercise).

Integration: Managers and clinicians will need more comprehensive decision support that facilitates integration of all aspects of primary health services, evidence-based guidelines, including high-risk individuals [11]. At the Soum and district level, managers and clinicians need more effective population-management tools. They need to be able to generate their own quality reports on demand and tailor reports to individual needs to initiate care delivery for patients in need of services. Since DHIS2 has a capability of reporting, analyzing and disseminating data for all health programs, clinicians and managers can easily generate their own reports for their community by using aggregated data (e.g. routine health facility data, staffing, equipment, infrastructure, population estimates) as well as event data (disease outbreaks, survey/audit data, patient satisfaction surveys, longitudinal patient records, etc.).

The potential contributions of EHRs to the Mongolian population and primary healthcare are substantial. However, the implementation of successful EHR is a complex matter involving a range of organizational and technical factors including human skills, organizational structure, culture, technical infrastructure, and coordination [12]. For the successful use of EHRs in Mongolia, EHR should not only support the above seven primary care attributes but effectively deal with privacy and adoption issues.

Privacy: Privacy and security concerns for EHR include patient information being stolen, lost, misplaced, or released without authorization. Many clinicians and patients are concerned that the EHR may be less secure than paper-based medical record. A study has shown that privacy is of concern to patients and clinicians and is a major barrier to adoption of EHR [13]. To encourage them to use EHR, a new legal authority may be needed through a new privacy law of other legislation to use the EHR for general population health information purposes in Mongolia.

Adoption: Resistance to change is another crucial challenge for the successful implementation of EHR in Mongolia. Research has found that clinician resistance is a challenge in the implementation of a new EHR system when switching from a paper-based practice. Some studies found that important implementation barriers to EHR adoption were lack of complete understanding from the staff, too little training during and after implementation, and lack of time for implementation and understanding [14]. Since most of clinicians at family health centers do not have any prior experience of using EMR or any information systems, they may be resistant to use EHR in the beginning and may not effectively use EHR for providing primary care or patient referrals. One strategy may be to limit the scope of the initial EHR and gradually expand to include more complex clinical information for clinicians to slowly increase their acceptability. Other strategies that decrease resistance include employing a user-friendly design, providing user-required information, and providing user training.

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