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Factsheet

Study of Global Digital Health Partnership Interoperability

Initial situation

The Global Digital Health Partnership (GDHP) was founded in 2018. It is a cooperation of different countries and their authorities, as well as the World Health Organization (WHO). Switzerland participates in this partnership. The aim of this partnership is to establish an exchange on best strategies and practices for digital health services and thus generate knowledge for the provision of better digital health services for the participating countries. Within the framework of this cooperation, white papers have been produced on various key topics, such as "interoperability", "cyber security", "evidence and evaluation" and "access by citizens* to their health data".

This factsheet summarises the main findings of the 2020 report on interoperability[1]. The comments, facts and arguments belong to GDHP.

Introduction

The study aims at understanding the barriers to advancing interoperability, and the creative solutions devised by the GDHP participants to overcome those barriers. It also discusses the healthcare purposes that have the highest priorities for interoperability.

Interoperability has long been considered necessary for connected health care. It improves care quality and safety, cost-effectiveness and patient empowerment. However, despite widespread desire for interoperability, global progress has been sporadic.

The most significant barriers were lack of capability to take action based on exchanged data, and poor usability and negative impact on providers' workflows. Sometimes, difficulty using electronic health record (EHR) stems from the lack of structure and standardisation of data. There are also significant economic barriers. In some locales, although interoperability can improve efficiency, it can also result in reduced payments or increased costs to providers. Governmental financial incentives have helped address economic barriers, with varying degrees of success.

Interoperability is driven by many purposes. GDHP noted that data exchange supporting transitions of care was the highest priority purpose, among several others that also ranked high (receiving laboratory and pathology reports, receiving diagnostic imaging reports, medication management, electronic prescribing and patient access). Direct patient care purposes ranked higher than secondary uses such as population health and research.

[1] Global Digital Health, *2020 Global Digital Health Partnership Launches White Papers*, https://www.gdhp.org/gdhp-whitepapers, accessed on 21st August 2020.

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GDHP realise the need for caution when generalising across a wide variety of countries and territories because of the many differences among them. Nonetheless, significant barriers all had low variability among their answers. The similarities in health care and human needs transcend the differences.

Barriers to interoperability

The highest barriers for Switzerland to interoperability concern the: lack of digital health system, lack of EHR capability to take action on exchanged data, data not available at point of care. The barriers rated as moderate are: lack of accurate patient ID matching, difficulty identifying and communicating with other entities, inconsistent implementation or constraints, lack of universal adoption of standards-based EHRs, poor usability and negative impact on workflows, difficulty managing coordinated collective action, increased costs due to interoperability.

Lack of EHR capability to take action based on exchanged data

The top-rated barrier was the lack of electronic health record (EHR) capability to take action based on exchanged data. It was considered a major barrier by more countries and territories (seven) than any other barrier. For example, the provider can view the data, but cannot import, reconcile and integrate it to update the corresponding information in the patient's record. Providers may protest, "What is the point of receiving data if I cannot *do* anything with it?"

There are two main aspects to this barrier. The first is lack of structure and/or standard terminologies in the content of exchanged data, and the second is the lack of functionality such as parsing capability in EHRs.

In Switzerland, most exchanged data are unstructured documents that can only be viewed, not parsed.

Even if the data are structured, there is also a lack of mature or widely adopted standards and guidelines for interoperability functions such as data reconciliation.

Poor usability

All respondents said it was a barrier. Poor usability was the first and most general among four questions about usability. It asked about the significance of the barrier of poor usability and negative impact on providers' workflows. For example, users complain that using interoperability functions are confusing, disruptive or take too much time. There are two main aspects to this barrier: poor or fragmented system design in EHRs and other health IT systems, and user attitudes and perceptions.

In summary, actual usability problems in IT systems plus the perception of negative impact when familiar work patterns were disrupted, plus the shortage of solutions thus far, all combine to push "poor usability" very high among the cited barriers.

Difficulty managing coordinated collective action among multiple

Even if all technical and standards issues are solved, implementing interoperability can be complex because it involves coordination among multiple entities without a single decision-making entity who can make them all work together or proceed at the same speed.

Effective interoperability requires all participants to agree upon certain rules and policies in order to exchange information, and it costs time and money to reach and implement agreements.

In summary, interoperability is inherently more complex than many other health or IT activities because of the multiple entities that must reach agreements. Legislation and collaborative approaches, uniting around the common good, have proven successful in some instances.

Increasing costs due to interoperability that entities cannot afford

The increased cost barrier had high agreement among countries. Cost is a barrier to interoperability for nearly every GDHP respondent. Some comments emphasised increased direct or indirect costs of interoperability, whereas others emphasised a perceived lack of benefits.

Lack of universal adoption of standards-based EHR

While every GDHP country and territory has EHRs, many experience a barrier when the EHRs or other health IT software do not support interoperability standards. In summary, it is difficult to quickly replace existing systems. Clinical practice already depends on existing software, for better or worse, and changes (whether upgrades or system replacements) require much planning, coordination and caution, to avoid disruption of patient care or other unintended consequences. Nevertheless, the installed base of EHRs is gradually conforming to interoperability standards.

Mentioned barriers

1. Interoperable data are not available at the point-of-care, when needed most. Complex privacy and security challenges associated with data exchange.
2. Inconsistent implementation or constraints on standards (lack of profiling[2]).
3. Difficulty understanding[3] what was meant by other providers, sometimes due to lack of standardised terminology. Difficulty identifying and communicating with other entities. This includes difficulty finding electronic addresses to connect to specific entities.
4. Unclear definition of the use cases and low end-user engagement and consultation. Remaining barriers in the survey:,
    a. Lack of infrastructure for secure transmission to another facility.
    b. Two or more incompatible versions of a standard are used.
    c. Legislation is subject to interpretation and the lack of clarity blocks interoperability implementation.
    d. Existing standards are inadequate for the desired purposes.

Solutions to barriers

Switzerland described an Electronic Patient Record solution in progress: “a national law sets the rules and standards that guarantee a nationwide integration. This law not only describes the organisational policies and regulations but also the whole architecture and technical standards that have to be used. So there is not much room for interpretation.” This will use IHE Profiles (XDS), Digital Imaging and Communications in Medicine (DICOM), CDA, FHIR, SNOMED CT and Logical Observation Identifiers Names and Codes (LOINC). This is a prospective solution, but not implemented yet.

Purposes for interoperability

Switzerland ranks as major purposes (3): identifying patients accurately; receiving laboratory and pathology reports and results; medication management; patient access. As moderate purposes (2),

[2] “Profiling” means applying constraints on a standard (e.g. which data elements are required, or which code systems are used for each data element) that all organisations agree upon, so that the exchanged information is clearly understood and used by all.

[3] “Understanding” means more than a person’s ability to view and comprehend the exchanged data, but that software can understand the data’s meaning and process it in a standardised way, such as for clinical decision support.

Switzerland lists: clinical ordering of diagnostic tests; e-prescribing of medication; receiving diagnostic imaging reports and results; referral management; transitions of care.

Transition of care

The highest ranked purpose was transitions of care, the movement of a patient from one setting of care (hospital, ambulatory physician practice, long-term care, home health, rehabilitation facility) to another. Most respondents ranked transitions of care as a high priority, Transitions have the highest need for interoperability.

Transitions of care most often involves sharing a clinical document such as a discharge summary in CDA format, at varying levels of structure (including embedded PDF). Because many countries and territories have not standardised on a fully structured CDA using standard terminologies, they experience the barrier of EHRs not being able to take action upon the data. Some countries share only partial transitions-of-care information. Social determinants of health are increasingly being recognised in some countries, but they usually are a lower priority than clinical considerations

Receiving Laboratory and Pathology Reports and Results

This purpose involves receiving results (imaging, laboratory, pathology) to help in diagnosis and improve efficiency by helping avoid duplicate tests. Most hospital users can receive results from tests performed within their organisation, but it is more challenging to receive results from facilities outside the provider organisation.

The benefits of receiving laboratory and pathology reports are clearly understood and mature standards exist. Unlike imaging results, many laboratory results are numeric with reference ranges, and could trigger actions if they are structured and codified in standard ways, but not otherwise. Lack of capability to take action on results is a subset of the top-ranked barrier identified in this white paper.

Receiving Diagnostic Imaging Reports and Results

The benefit of receiving recent imaging reports is especially important given the higher impact on a patient (compared to laboratory tests) if an imaging procedure is unnecessarily repeated: increased radiation exposure, increased cost, and wasted time. Also, imaging reports, and images themselves, are less susceptible to the terminology barriers that can hinder other types of data exchange.

Medication Management

Medication management includes managing and reconciling the history of medications ordered, dispensed and administered, to help maintain a current patient-centred medication list, which is critically important for patient safety. Electronic prescribing (e-Prescribing) can complement medication management to the extent that it facilitates a comprehensive view of a person's medications, and standardised medication terminology can enhance the value by enabling interaction checking and other clinical decision support.

Electronic Prescribing of Medication

Electronic prescribing (e-Prescribing) is a high priority and a success in many countries. The intended benefits of e-Prescribing are both improved efficiency for administrative and billing purposes, but also patient safety through allergy and drug-interaction checking.

It is difficult to find a standardised solution that seamlessly transfers across countries due to the lack of international consensus standards for medication terminology and prescription transactions. Nevertheless, there is potential for learning from the mature systems that have been implemented.

Patient Access

Patient access, at a minimum, means that a patient can view some of the information in their record. However, in the context of interoperability, a more stringent definition was proposed for this white paper. The survey defined it as "patients participating in exchange" such as allowing patients to download copies of their health information or send their patient-generated health data (PGHD) to an organisation. It is about more than what information is exchanged; it is about the patient having a level of control.

Patient access was ranked a medium or high priority by all but two respondents.

Key findings

Highly significant barriers faced by GDHP participants have been identified. They remain persistent and nearly universal.

- The most significant barriers are lack of EHR capability to take action and make effective use of exchanged data, and poor usability: these are the weakest links in the interoperability chain.
- Economics remains an obstacle, as costs can inhibit organisations from implementing interoperability. Sometimes there may be more incentive to not exchange data because of how health care is reimbursed.
- Countries and territories that have not yet overcome barriers can learn from the experiences of those who have overcome them by using standards, legislation, policies and best practices. Several respondents offered to share their solutions with other countries.

Transitions of care is the most significant purpose, followed by receiving of laboratory and imaging reports, though there is not much of a distinction in priority between several interoperability purposes.

International standards are supported by most GDHP participants, most notably those from ICD, SNOMED CT, HL7 v2, IHE, DICOM, LOINC, HL7 CDA and FHIR. FHIR is touted as a key to several of the solutions described. International Standards Organisation (ISO) and OpenEHR standards are much less used. All countries are committed to the importance of standards for interoperability, though some use "national" (not international) standards where necessary for some use cases.

Switzerland indicates the following standards: HL7 (v2, v3, CDA and FHIR); IHE, ICD (9/10/11), SNOMED CT, LOINC, DICOM.

Recommendation and next steps

The most common recommendation is for GDHP to create a Global Master Standards Guide (GMSG) on use of specific standards for various interoperability needs. While there is already alignment on baseline standards, consistent and detailed guidance on implementation is needed. The second common recommendation is for the GDHP to develop a Global Interoperability Maturity Model (GIMM) to demonstrate the interoperability adoption level of countries.