# The State of National Health Information Exchanges in Asia

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## Abstract

In this study, we assess the state of national health information exchanges (HIE) in Asia based on a survey of seven Asian countries. We enquire into the governance and management of the HIEs, as well as their use cases, architectures and use of both national and international standards. We find that while most nations are working towards building national HIEs, they are far from going to scale.

**Keywords:** Health Information Exchange, standards, architecture, governance.

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## Introduction

National health sectors are commonly tainted by a fragmented landscape of information systems, as various information systems are implemented independently and in isolation across different health domains, such as health management, logistics, facility registers and human resources[1-5]. While the different information systems are often designed, structured and implemented to serve the unique needs of particular health services and health programmes, little thought has been given for the overall harmonization of information systems used within the national health sectors[4]. In effect, health care practitioners are struggling with understanding the full breadth of an individual's health history, as information is disaggregated and stored in different locations and formats. In response to this issue, nations are establishing information exchange between information systems in the health sector to improve the efficiency in accessing information crucial for health care delivery. HIE facilitates more exhaustive and timely sharing of

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information between information systems used in in health care, making information accessible to both providers and patients when and where it is needed.

In this study, we assess the state of national HIE in Asia, and enquire into the governance and management of the HIEs, as well as their use cases, architectures and use of national and international standards. A survey was conducted among eHealth-related practitioners, gathering survey data from seven countries across Asia.

The remainder of this paper is organized as follows. In section two, we describe our method. In the third section, we present our results. Finally, we provide concluding remarks in section four.

## Methods

The Asia eHealth Information Network (AeHIN) received a request for a survey of the state of HIEs in Asia from the National eHealth Technical Working Group of the Philippines. AeHIN is a network of eHealth-related practitioners and organizations (government agencies, private and civil society organizations, development agencies) in the fields of health information, vital statistics, epidemiology, health/biomedical informatics, knowledge management, civil registration, health sector information communication technology (ICT) project management, organizational development, and related disciplines. As of today, the network has approximately 600 members across Asia. The purpose of the network is to achieve better health by promoting better use of ICT through peer-to-peer assistance, knowledge sharing, and learning, following a regional approach for greater country-level impacts across South and Southeast Asia.

For the survey, national eHealth focal points were contacted directly through AeHIN. In addition, an email was sent to all AeHIN members encouraging them to respond to the survey if they believed that their country had a HIE. The survey consisted of questionnaire with open-ended questions related to governance, management, use cases, architecture and standards of the HIE. Reponses were gathered from a total of seven Asian countries, namely Bangladesh, India, Pakistan, Cambodia, Malaysia, the Philippines and Indonesia.

The questions included in the Survey:

GOVERNANCE:

1. Who governs over your HIE?
2. What use cases have you applied/will apply your HIE?

ARCHITECTURE: What architecture do you use for your HIE? (OpenHIE, OpenHIE-like, own)

PROGRAM MANAGEMENT:

1. Who manages your HIE?
2. Operations started when?
3. Number of transactions per day

STANDARDS:

1. What international standards do you use?
2. What national standards do you use?

## Results

Based on the data collected from the survey, it was found that most of the countries are either planning to establish national HIE, or have already partially implemented HIE for a few use cases **(Table 1).** Of all the countries represented in the responses, Cambodia was the only country in which the respondent did not explicitly state that the country is planning to set up national HIE. The respondents from Bangladesh, India and Pakistan stated that their countries are in the early planning phase of establishing national HIE, but did not further elaborate on these plans.

**Table 1.** The state of HIE in seven Asian countries

| No plan for HIE | HIE in early planning phase | HIE partially implemented |
|---|---|---|
| Cambodia | Bangladesh<br>India<br>Pakistan | Malaysia<br>The Philippines<br>Indonesia |

In Malaysia, the national HIE, named MyHIX, is used to exchange patient's discharge summaries for the purpose of supporting continuity of care. The operations of MyHIX started in 2011, and it is currently implemented in a total of seven hospitals and one health clinic with MyHIX. In 2016, there was

an average 2971 transactions occurring in the MyHIX per day. The country has recently upgraded to MyHIX 2.0 which makes it possible to send e-referrals and reply notes. MyHIX use cases applied includes (i) antenatal case referral between Putrajaya Health Clinic and Putrajaya Hospital; (ii) cardiology case referral between Kota Bharu Hospital and Kuala Terengganu Hospital; and (iii) surgical and orthopedic case referral between Port Dickson Hospital and Seremban Hospital. The country is planning to implement IP Laboratory and IP Radiology in the future.

In the Philippines, the construction of the Philippine Health Information Exchange (PHIE) has been approved by a government body. 800 000 US dollars has been allocated and has been used to issue a tender for a private vendor to run the PHIE. So far, two biddings have failed. While waiting for the full PHIE, the Department of Health and Philhealtha, an agency attached to the Department of Health, has agreed to run a simpler PHIE Lite version with a fixed number of data elements. The PHIE Lite is only for the exchange of outpatient benefit claims and is not scalable for any type of health information. As of June 2017, an average of 20,000 transactions has occurred in the PHIE Lite per day.

Since 2015, HIE has been in operation in Indonesia. The Indonesia HIE is used for exchange of data between the national civil registrations system and the national health insurance system. Until May 1, 2017, the Indonesian HIE covered 176 million population. Health care services for the members were provided by 20,775 primary cares and 2,128 hospitals throughout Indonesia. In 2016, Indonesian HIE recorded 192.9 million visits, consisting of 134.9 million visits to the gatekeepers, 50.4 million visits to ambulatory care in hospitals and 7.6 million cases of inpatients. In terms of electronic transaction from healthcare providers to the Indonesian HIE, it is estimated that there 1-2 million electronic transactions per day, including 15 thousand transactions per day for updating membership data **(Table 2).**

**Table 2.** The actors responsible for the governance and management of HIEs in three Asian countries.

| | Malaysia | The Philippines | Indonesia |
|---|---|---|---|
| Governance | The Ministry of Health | The National eHealth Governance Steering Committee | Center for Data and Information of The Ministry of Health |
| Management | eHealth Planning Unit, Planning Division, The Ministry of Health | National eHealth Program Management Office | The Ministry of Health |

The HIEs in Malaysia, Philippines and Indonesia are all governed and managed primary by government bodies **(see table 2)**. In the Philippines, The National eHealth Governance Steering Committee was convened by the chair Secretary of Health on October 13, 2014. Members of the committee are Secretary of Science and Technology (co-chair), the president and chief executive officer of the Philippine Health Insurance Corporation, the chancellor of the University of the Philippines Manila. Recently, the secretary of the new Department of Information and Communications Technology was added to the Steering Committee.

**Table 3.** The architecture and standards used for HIE in three Asian countries.

| | Malaysia | Philippines | Indonesia |
|---|---|---|---|
| Architecture | Based on ebXML | Based on the OpenHIE framework | Based on JBoss |
| International standards | - Integration profile: IHE<br>- Information exchange standard: HL7<br>- Data standards: ICD 10, Snomed CT, LOINC, DICOM | None | Data standards:<br>- ICD 10 |
| National standards | - Public Sector Data Dictionary (DDSA)<br>- Ministry of Health's ICT Security Standards (DKICT KKM) | - The National Health Data Dictionary<br>- The Philippine Standard Geocodes (PSGC) | - Pharmacy code<br>- Facility code |

| | Malaysia | Philippines | Indonesia |
|---|---|---|---|
| | - Public Sector Cyber Security Framework (RAKKSA)<br>- National Health Data Dictionary (NHDD)<br>- List of codes for National Healthcare facility/services from the National Health Informatics Centre, Ministry of Health | - The PhilHealth Primary Care Benefit package standards | |

Table 3 shows that in the three countries in which HIE is partially established, the architectures used for HIE are dissimilar. The Philippines is the only country which have based their HIE architecture on a framework (the OpenHIE framework) developed specifically for HIE. The OpenHIE framework is a modern architectural solution, driven by a global community of practice, which is being increasingly promoted to low-income and middle-income countries seeking to make the sharing of health data across systems possible.

In terms of international standards, Malaysia has adopted a variety of standards, the Philippines are using none, and Indonesia has only adopted the ICD 10 data standard for medical classification. All the countries have adopted national standards, ranging from standard facilities codes to health data dictionaries.

## Discussion and Conclusion

This study set out to use survey data to assess the state of national HIE in Asia. Data was collected from seven countries. The study results show that most countries are working towards building national HIE, and that the efforts are primarily driven by their respective authorities. However, it is evident from the results of our survey that the Asian nations are far from going to scale with national HIE. The respondents of the survey have expressed that they are facing similar challenges in their efforts towards HIE. Among them are financial constraints, gaps in supportive infrastructure and communication network especially in rural areas, and issues pertaining to information sharing policy, confidentiality and privacy, and security as a whole.

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