

Table 1: Barriers to Healthcare Information Sharing

Barrier categories	Studies	Highlighted key findings
Technical	Keller et al., 2009 Panhuis et al., 2014 Ondieki et al., 2017 Kritchanchai et al., 2019 Schulz et al., 2019 P. Bogaert et al., 2021 Spanakis et al., 2021	<ul style="list-style-type: none"> - All stakeholders in the healthcare supply chain need accurate and consistent information to efficiently respond to the demand and support in both clinical and logistics activities. - EHR systems have not been successfully implemented due to data fragmentation and data accessibility among different information systems, which could be heterogeneous and context-dependent. Sometimes the data appears incomplete, or possibly incorrect. - Ineffective healthcare information management systems cause redundant processes and long waiting times for patients.
Political	Whitworth, 2010 Kawtrakul et al., 2011 Panhuis et al., 2014 Kijisanayotin, 2016 Kijisanayotin, 2016 C. Guerrazzi and S. Feldman, 2020	Health information standards seem fractious because of unavailable national data standards, unclear guidelines, and lack of best practices. Also, the lack of standards creates a barrier for people to effectively collaborate and causes the limitation to data sharing across systems in the interpretation phase.
Motivational	Keller et al., 2009 Lluch, 2011 Kawtrakul et al., 2011 Panhuis et al., 2014 C. Guerrazzi and S. Feldman, 2020	<ul style="list-style-type: none"> - Personal or institutional motivations and beliefs that confine data would depend on organizational management. - The presence of knowledge required before using HIE and inadequate training to

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		<p>use HIE. However, no proactive mindset from the administrative officers is a struggle point for turning the concept of national standard into practice.</p>
Economic	<p>Keller et al., 2009 Panhuis et al., 2014 Kijisanayotin, 2016 Lengel et al., 2020 P. Bogaert et al., 2021 Spanakis et al., 2021</p>	<ul style="list-style-type: none"> - Massive challenges to health information system capacity, particularly in low- and middle-income countries, require infrastructure development, capacity building, and efficient financing. - Barriers to the adoption of health data standards in Thailand are a lack of human resources in health informatics, lack of awareness, and unfamiliarity with the potential benefits of using standards and terminologies in healthcare. - Applying the blockchain in healthcare information systems remain challenging due to additional complexity and management cost.
Legal	<p>Sakunphanit, 2006 Anderson & Seltzer, 2009 Moher et al., 2010 Whitworth, 2010 Panhuis et al., 2014 Azarm et al., 2017 Watkinson et al., 2021 P. Bogaert et al., 2021</p>	<ul style="list-style-type: none"> - Various laws can cause uncertainty for healthcare providers in implementing IT. Especially, privacy concern is a barrier hindering the implementation of IT in health information systems. - Lack of solid commitment from healthcare stakeholders and other public health facilities because of inadequate law enforcement by the authority. - Legal governance is required, as support

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		<p>mechanism to facilitate or set mandates for essential elements such as minimal data set, and information technology architecture.</p> <ul style="list-style-type: none"> - The absence of HIE involvement and evaluation would impact the overall success of the program implementation and improve the adoption. Therefore, in any healthcare information sharing plans, reinforcements, or mandates, should be agreed upon by the majority of stakeholders as a consensus concept.
Ethical	<p>Panhuis et al., 2014 C. Guerrazzi and S. Feldman, 2020 P. Bogaert et al., 2021</p>	<ul style="list-style-type: none"> - There is complexity in bridging the legal and ethical gap, especially General Data Protection Regulation interpretation and practice - Leadership, trust and commitment, and organizational culture for HIE adoption would be manipulated by organization-specific approaches