Review article

Barriers and facilitators to exchanging health information: a systematic review

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A R T I C L E   I N F O

A B S T R A C T

Objectives: We conducted a systematic review of studies assessing facilitators and barriers to use of health information exchange (HIE).

Methods: We searched MEDLINE, PsycINFO, CINAHL, and the Cochrane Library databases between January 1990 and February 2015 using terms related to HIE. English-language studies that identified barriers and facilitators of actual HIE were included. Data on study design, risk of bias, setting, geographic location, characteristics of the HIE, perceived barriers and facilitators to use were extracted and confirmed.

Results: Ten cross-sectional, seven multiple-site case studies, and two before-after studies that included data from several sources (surveys, interviews, focus groups, and observations of users) evaluated perceived barriers and facilitators to HIE use. The most commonly cited barriers to HIE use were incomplete information, inefficient workflow, and reports that the exchanged information that did not meet the needs of users. The review identified several facilitators to use.

Discussion: Incomplete patient information was consistently mentioned in the studies conducted in the US but not mentioned in the few studies conducted outside of the US that take a collective approach toward healthcare. Individual patients and practices in the US may exercise the right to participate (or not) in HIE which effects the completeness of patient information available to be exchanged. Workflow structure and user roles are key but understudied.

Conclusions: We identified several facilitators in the studies that showed promise in promoting electronic health data exchange: obtaining more complete patient information; thoughtful workflow that folds in HIE; and inclusion of users early in implementation.

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Contents

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1. Introduction

Patients in the US often receive care from multiple providers who practice in unaffiliated organizations. The result is that the patient's clinical record can be fragmented and incomplete in any one given location. Health information exchange (HIE) is the process of electronically exchanging clinical information across organizational boundaries and seeks to remedy this fragmentation [1]. This exchange occurs among health care providers, across the boundaries of health care institutions, health data repositories, states and countries, typically not within a single organization or among affiliated providers, while protecting the integrity, privacy, and security of the information. Some projections have estimated that HIE effectiveness may manifest in billions of dollars of savings per year all the while improving quality of care [2]. Outside of the US, HIE is also important in other countries with advanced health care systems [3,4].

The US government as well as other national governments are making substantial investments to further the growth of HIE. Many local governments and individual health organizations are also following suit. As part of the Health Information Technology for Economic and Clinical Health (HITECH) Act of 2009, substantial funding for the creation of HIE was made available and there has been marked growth in HIEs in the US [5].

Since 2009, the number of hospitals and providers exchanging data has sharply increased but perceived barriers to use has not been well described [6]. While organizational involvement and capacity for HIE are increasing, the data about actual use of accessible HIE have been limited and suggest that HIE is still not integrated into usual care [6]. Health professionals are the primary users of HIE systems but little is known about their perceptions of such systems and the barriers they face [6]. A system that the users find slow, confusing and awkward is likely to see little adoption by front-line providers. This article expands on the work conducted as part of a larger systematic review conducted under the auspices of the Agency for Healthcare Research and Quality (AHRQ) and registered as PROSPERO Registry No. CRD42014013285 [6]. The purpose of this article is to describe the current evidence on perceived barriers/facilitators to HIE use. Prior reviews focused on barriers to HIE adoption and implementation, primarily in the US [7–9].

2. Materials and methods

HIE was defined as the *electronic* sharing of clinical information among users to facilitate care coordination and transitions across settings. This excludes exchange of predominantly paper-based information [6]. A standard protocol for the review was developed that incorporated input from key informants and a technical expert panel [10]. Detailed methods and search strategies for the larger review can be found in the technical report [6]. We used the bibliographies of prior reviews [7–9] to verify our search strategy and identify additional studies. We considered the findings reported in the prior reviews as we developed groupings of barriers and facilitators.

2.1. Data sources and searches

A research librarian conducted electronic database searches using combinations of terms related to HIE (e.g., health information exchange, healthcare information, medical records linkage, clinical data exchange) to identify relevant articles published between January 1990 and February 2015 in MEDLINE (Ovid), PsycINFO, CINAHL, and the Cochrane Library databases (see Appendix A of the main report) [6]. This search was peer reviewed by a second librarian. We also searched reference lists, table of contents of journals not indexed in the databases searched, and consulted experts in the field.

2.2. Study selection

English-language studies that contained data on facilitators and barriers to use of implemented HIE systems were included. We included studies performed both in the US and in other countries. Studies describing HIE that was in the planning phase or that described HIE systems at a single site without providing information related to barriers and facilitators to use were excluded. We also excluded studies that described simple remote access in which a clinician in one healthcare system logged into the separate system of another healthcare organization without electronic system-to-system transfer of information. Two investigators independently evaluated each study to determine inclusion eligibility. Disagreement was resolved by consensus with a third investigator making the final decision as needed.

2.3. Data extraction and risk of bias assessment

One investigator extracted detailed information from included studies, and a second assessed for accuracy and completeness of data. Details extracted included study design, setting, geographic location, characteristics of the HIE implementation, evaluative data, analysis, and results. When sufficient detail was provided, two investigators assessed the methodological strengths and weaknesses of each study based on the following: whether the sampling strategy was reported (Yes/No) and appropriate, meaning likely to produce a sample representative of the population of interest (Yes/No); whether the response rate was reported (Yes/No) and then listed response rate in percent and acceptable given the type of study (e.g., over 70% for targeted interviews; over 20% for general mail surveys) (Yes/No); whether the characteristics of the respon-