

National Monitoring and Evaluation of Health IT: Protocol for a Scoping Review

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Abstract. *Background:* Monitoring the pace of Health Information Technology (HIT) adoption across states is critical for providing data to formulate future national and regional HIT policies. However, repeated monitoring of the progress on implementation of the strategies is often scarce. The lack of systematic monitoring of progress in availability and use of HIT has led to a need for an overview of the key concepts and methodologies used in the scattered scientific literature. The scoping study aims at achieving both in-depth and broad results, identifying all relevant material, regardless of the design. This paper presents and discuss a protocol for a scoping review. *Objective:* We aim to provide a comprehensive overview of the existing body of knowledge and to assess the extent, range and nature of monitoring and evaluation of availability and use of HIT at a national or regional level. This scoping review includes peer reviewed and grey literature. *Methods:* The search strategy is iterative and developed in cooperation with information specialists and key researchers in the field. Inclusion, data extraction, and quality assessment will be done by two independent reviewers. Data will be collated, summarized and analyzed thematically. *Current status:* 1760 references were included for screening. After screening for eligibility based on title and abstract 84 publications were included for full text review, which is currently being done. Final results are expected in March 2017. *Conclusion:* This scoping review will map the existing body of literature and describe the current approaches to monitoring and evaluating HIT on a national or regional level. The review will provide evidence-based information in order advance national strategies for monitoring and evaluating availability and use of HIT.

Keywords. eHealth, monitoring, evaluation, national, scoping review

1. Introduction

Globally, most WHO Member States have drafted eHealth strategies [1]. The Nordic countries' eHealth strategies contain comparable elements [2, 3]. Monitoring the pace of Health Information Technology (HIT) adoption across states is critical for providing data to formulate future national and regional HIT policies. However, repeated monitoring of the progress on implementation of the strategies are often scarce, although it is recognized that evaluation is important [4]. Longitudinal data collection can provide feedback that can be used in ongoing implementation activities, but are often costly, time consuming, and very complicated [4, 5]. Further, it may take years for potential benefits and consequences to appear, so the time frame is also important [4].

For years, the primary goal of implementing HIT was to improve clinical care processes, quality of health care and patient safety [6]. HIT was implemented because

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it was considered the ‘right thing to do’ [6]. However, the evidence base behind the actual impact of HIT was not questioned and evaluations lagged behind the project work [6]. The lack of systematic monitoring of progress in availability and use of HIT has led to a need for an overview of the key concepts and methodologies used in the scattered scientific literature.

A scoping review can ‘aim to map *rapidly* the key concepts underpinning a research area and the main sources and types of evidence available [...], especially where an area is complex or has not been reviewed comprehensively before’ [7]. The scoping study aims at achieving both in-depth and broad results, identifying all relevant material, regardless of the design [8]. This scoping review aims at investigating the current approaches to monitoring and evaluating the availability and use of HIT on a national or regional level.

1.1. Scope of the Review

We aim to summarize the present activities of monitoring and evaluation of HIT at a national or regional level, undertaken by researchers, organization or government bodies. With a scoping review we aim to provide a comprehensive overview of the existing body of knowledge and to assess the extent, range and nature of monitoring and evaluation of HIT at a national or regional level.

This protocol is based on the five stages suggested by Arksey and O’Malley [8]. The protocol has been reviewed by peers and information specialists and revised as required. The included studies will be assessed, scored, categorized and synthesized in order to gauge the methods used and quality in the studies regarding this field of research.

1.2. Stage 1 – Identifying the Research Question

The research question guiding this scoping review is based upon work done in the Nordic eHealth Research Network (NeRN). The network consists of leading researchers within the field of eHealth in the Nordic Countries (Denmark, Norway, Iceland, Finland and Sweden). For years the NeRN has been working with cross-country benchmarking of eHealth and through that work explored the difficulties lying in national monitoring and evaluation of HIT. Therefore, this review is guided by the research question: What are the current approaches to national or regional monitoring and evaluation of HIT?

The objectives of this study is to: i) to map the existing literature, ii) to describe the current approaches, thus providing an evidence-based summary of international research literature, iii) to inform further research in the NeRN, and iv) to provide an agenda for national and regional monitoring or evaluating availability and use of HIT to be used by the decision makers in the Nordic countries.

2. Materials and Methods

HIT can be defined as “the application of information and communication technologies across the whole range of functions that affect the health sector and including products, systems and services that go beyond simply Internet-based applications” [9]. In this study, HIT will be limited to systems and services in relation to primary and secondary

care. This includes, but not limited to, Electronic Health Records (EHR), Electronic Patient Records (EPR) and Electronic Medication Records (EMR).

2.1. Stage 2 – Identifying relevant studies

The search strategy targets a number of potential sources of materials on monitoring and evaluating HIT at a national or regional level, including full text databases and output from governments and known centers of excellence. The search strategy has evolved iteratively, with the preliminary search strategy providing over 5000 research articles. This approach proved to be too broad, containing a large number of irrelevant studies, and was adjusted in cooperation with information specialists and key researchers in the field of eHealth.

The structured search will be divided into two sections:

- Monitoring or evaluating **availability** of HIT on a national level
- Monitoring or evaluating **use** of HIT on a national or regional level

A list of relevant terms, including synonyms and alternate terms, from the research question will be compiled. Medical Subject Heading (MeSH) terms, Thesaurus and related words found in key words and relevant references will also be searched. The search strategy consists of a combination of MeSH and keywords, will be iteratively tested in different databases and refined, and will be adapted to other databases when required.

To identify and collect original peer-reviewed publications and reviews, we searched PubMed, SCOPUS, and Web Of Science databases. Danish, Norwegian and Swedish national bibliographic databases were likewise searched. A structured search for Grey literature, such as national or organizational reports, will be performed using the Canadian Agency for Drugs and Technologies in Health checklist for grey literature 'Grey Matters' [10]. Furthermore, references of articles included in this scoping review will also be searched.

A directory of the literature found during the search will be upheld in Mendeley [11]. After duplicate check, all references will be exported into Covidence [12], a web based program for assisting review studies.

2.2. Stage 3 – Study selection

The process of selecting the literature will be iterative through assessing the eligibility criteria, screening process and reviewing the full text items for inclusion, thus retaining only literature concerning monitoring or evaluating availability and use of HIT on a national or regional level.

Inclusion criteria will comprise of i) publications from peer-reviewed journals, ii) grey literature, iii) publications in English, Danish, Swedish or Norwegian, and iv) publications regarding national or regional level. The exclusion criteria will comprise of i) publications only describing a single IT system, ii) publications regarding Dentistry, Education and Training of healthcare personnel, Tele homecare, Telemedicine, nursing homes or long term care facilities, iii) full text not available, iv) undergraduate, MSc and PhD dissertations, and v) book reviews and likewise. Literature in form of abstracts only, short reports or letters will not be included or analyzed in this review unless they offer a unique or new contribution.

Titles and abstracts will be examined for eligibility by two independent researchers. Discrepancies will be resolved through discussion. Publications deemed relevant

by screening on title and abstract will be subject for full text review. Full text review will likewise be performed by two independent reviewers.

2.3. Stage 4 – Charting the data

A flow diagram of the literature search will be outlined and a data charting form based on Arksey and O'Malley's approach [8] will be developed in order to systematically capture data from the identified publications. The data will include information on citation type (e.g. original research), country, level (national or regional), year of study, method of monitoring or evaluating (e.g. survey), sample size, and quality of the study. The spreadsheet will be revised as required. Two researchers will extract the data independently.

2.4. Stage 5 – Collating, summarizing and reporting the results

We anticipate the results to contain both qualitative and quantitative approaches. The included studies will be evaluated by using the Mixed Methods Appraisal Tool (MMAT)[13, 14]. The intention is not to exclude studies of poorer quality, but to map the overall quality of studies in this field of research.

Charts and tables will be used in the collation and summary of the results, e.g. the methods used and chosen indicators. The results will also be interpreted thematically, based on an interpretive synthesis approach of the literature included. The results will be reported by frequency of e.g. study design, geographical placement, and quality scores.

Throughout the process the strategy and findings of this scoping review will be shared with the NeRN in order to validate our findings and adjust the methods. The progress and preliminary results will be presented at the biannual meetings of the NeRN.

The results of this scoping study will be summarized in an overview of the current approaches to monitoring and evaluating the availability and use of HIT on a nation or regional level, as well as pointing out areas that may benefit from further research.

3. Current status of the scoping review

Using the appropriate search terms, the search relating to monitoring or evaluating **availability** of HIT on a national level provided 874 publications after duplicates were removed. Likewise, the search relating to monitoring or evaluating **use** of HIT on a national or regional level provided 849 publications. The search for grey literature resulted in 37 publications. Collectively, 1760 publications were included for screening.

After screening for eligibility based on title and abstract, 46 publications regarding availability, 24 publications regarding use and 14 grey literature publications were included for full text screening. In total, 84 publications will be reviewed in full text. In addition to this, references will consecutively be searched by hand. At this point 14 articles are included for full text screening through this method of pearl searching.

4. Discussion

Based on a preliminary search strategy, which resulted in over 5000 search results, we anticipated some challenges in this scoping review. eHealth is a relatively new research field, with a rapidly evolving terminology. In PubMed eHealth is still indexed as an entry term to Telemedicine, although research communities regard eHealth as the major term, including telemedicine, EHR, EPR, EMR etc. The rapid evolvement in terminology complicates a sufficiently specific search strategy, since publications dated less than 10 years back may use keywords that presently are found irrelevant. Additionally, this research field is often disseminated through conference presentations and posters. If conference proceedings are not published and proper indexed, they will not be included in this review, thereby introducing selection bias. This will be sought countered by involving key researchers in the field and including literature found through pearl search.

Furthermore, in the literature regarding monitoring and evaluating HIT there is apparently no clear distinction between availability and use. Some studies report use as the clinicians access to use a given functionality, and not whether the clinicians actually use it. Thus, there is a need for a stronger distinction between when HIT is available and when it is actually used.

All searches have been performed and the screening on title and abstract has been executed. Presently, the full text reviewing is ongoing and the next step will be to extract the data and to collate and summarize it in order to answer the research question.

5. Conclusions

This scoping review will map the existing body of literature and describe the current approaches to monitoring and evaluating HIT on a national or regional level. A systematic protocol will help to provide a scoping review that can inform the research agenda for national and regional monitoring and evaluating HIT by offering an evidence-based summary of international research literature on the approaches to monitor and evaluate HIT on a national or regional level. The goal of the review is to provide evidence-based information in order advance national strategies for monitoring and evaluating HIT in developed countries.

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