Chapter 12
ICT for Enabling the Quality Evaluation of Health Care Services: A Case Study in a General Hospital

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ABSTRACT

Medical practice, monitoring and control guidelines enable standardization, assessment and quality improvement in healthcare. This often implies collecting and analyzing electronic medical records (EMRs) in order to calculate compliance metrics and support evidence-based decision-making. However, for these benefits to materialize a set of challenges must be overcome, including the complexity required to represent guidelines in such a way that compliance can be automatically determined with the aid of software; the combination of both structured and unstructured (narrative text) data; and cultural or political barriers. In this chapter, we present a strategy to overcome these challenges using three case studies in chronic disease for a developing country. As such, this work contributes an approach to enable the use of ICT-supported medical guideline evaluation, in order to contribute to a more reliable and context-dependent way of improving healthcare in developing countries in particular.

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INTRODUCTION

Medical guidelines have been widely used by governments and institutions to assess and improve the quality of healthcare services. They are typically developed through an evidence-based decision-making process and address elements for effective delivery of healthcare services considering a variety of settings, contexts and populations. For an institution, compliance with government regulation and internal standards of quality is the main priority, followed by an analysis for quality improvement as well as an input for detecting opportunities to generate new services. Once indicators have been aggregated over a set of institutions, region or countrywide analysis is possible conducing to recommendations in terms of public health policy.

The method used for evaluating compliance with a medical guideline depends on the institution, but is usually highly dependent on manual processes that involve selecting and checking a sample of medical records for where the guideline is applicable. Even though automatic evaluation of facts contained in Electronic Medical Record (EMR) systems should be a more effective strategy for evaluating whether an institution is following a guideline, the real complexity behind this strategy limits the possibilities. Such complexity results in the following set of challenges:

1. The first difficulty is structuring the guideline itself. Most guidelines are defined for human medical experts, so in order for them to be used as standards for automatically calculating an institution's compliance, they need to be structured for computer readability as well. Part of the issue is how to support the mechanical step-by-step procedure for structuring the guideline, but also checking that the guideline is complete, accurate, and easy to register and edit.
2. The second challenge stems from the fact that once a guideline is defined for direct, computer-supported analysis it will then have to be applied over a set of existing EMRs. However, often each EMR is a mix of structured and unstructured data. This means that there will be an initial problem in identifying the set of EMRs over which to calculate compliance. Furthermore, once the set of EMRs has been properly identified, calculating compliance will need to include structured data as well as narrative text contained in each record to verify compliance with the guideline.
3. Last but not least, there remains a non-technical hurdle. Cultural or political barriers may be at least as critical. On the preparation stage, there may be resistance or insufficient capability for the information to be properly recorded in the EMR system; there may be insufficient incentives; there may be lack of awareness or fear; and there may be disagreement or inconsistency with respect to the accuracy, depth or method that each institution is using and a consequent concern that aggregate indicators may be incomplete, incoherent, misused or strategically manipulated by others.

This chapter focuses on the first challenge and in doing so provides an initial strategy for dealing with the other two, especially in developing countries where unstructured data and immature EMR systems are more widespread. As such, it proposes a data structure for enabling the quality evaluation of health care services. This data structure allows the definition of an assessment tool for any medical guideline that can be applied semi-automatically to a set of EMR contained in an existing EMR system. The completeness of the proposed data structure was validated using it to describe a sample of medical guidelines recommendations related to prevalent diseases in a general hospital of a developing country.

The chapter is structured as follows: Section 2 reviews how the evaluation process is currently done and which projects have been proposed already to structure the guidelines, then Section 3 describes our