Which functionalities are available in the electronic health record systems used by French general practitioners? An assessment study of 15 systems

David Darmon[a,*], Rémy Sauvant[a], Pascal Staccini[b], Laurent Letrilliart[c]

[a] Département d'Enseignement et de Recherche en Médecine Générale, Faculté de Médecine, Université de Nice Sophia-Antipolis, France
[b] LabSTIC, Faculté de Médecine, Université de Nice Sophia Antipolis, France
[c] Département de Médecine Générale, Faculté de Médecine Lyon-Est, Université de Lyon 1, France

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ABSTRACT

Objective: Whereas an unprecedented effort is currently under way worldwide for the implementation of electronic health record (EHR) systems, their capabilities are poorly understood, especially in primary care. The objective of this study was to assess the main functionalities of the EHR systems used in French general practices.

Methods: Among the 20 EHR systems marketed in France, we assessed the 15 systems used by more than 1500 general practitioners in the Provence-Alpes-Côte d'Azur region in the southeast part of France. Each EHR system was assessed in a general practice office, using two clinical vignettes describing virtual patient consultations. The evaluation criteria were derived from the EuroRec requirements for EHR system quality. The assessment scale included 37 criteria grouped into three sets: background data, consultation data, and exchange functionalities. The scoring system used, totalling 64 points, was based on the validation of the criteria and was adjusted based on the possibility of standardising the data. A high score indicated a good EHR system quality.

Results: The median global score was 32 points out of a possible 64 (range: 20–39). The median score was 12 points out of 22 (range: 6–15) for the background data set, 16 points out of 32 (range: 9–22) for the consultation data set, and four points out of 10 (range: 0–6) for the exchange functionalities. No association was found between the number of users and the assessment score of the EHR systems ($p = 0.79$). One third of the EHR systems lacked a problem list and only one of them supported the episode of care.

Conclusion: Functionalities noticeably vary among the EHR systems currently used in French primary care. Whereas these systems are globally very focused on drug prescriptions, several core functionalities are frequently lacking. They are also poorly interoperable for healthcare professionals and patients. Further research is necessary to assess their actual use.

1. Introduction

Electronic health record (EHR) systems are part of an evolving concept comprising a wide range of information systems, from files compiled in single units of care to longitudinal collections of patient electronic health data [1]. EHR systems' primary use is to support the continuation of efficient and quality

integrated health care, based on reminder functions for patients' health histories and on automated decision support systems, which provide alerts and advice on diagnosis or treatment [1–3]. Their secondary uses include quality assessment, safety monitoring, health policy planning, and medical research [4,5]. If shared, the information collected in EHR systems can also support communication between healthcare providers [6].

All these uses can be facilitated by the integration of core functionalities (SOAP model, problem list, episode of care) and the standardisation of health information. The SOAP model is the possibility to enter notes in a template to document patients' concerns and the health issues managed during encounters. In the SOAP model, the S stands for the symptoms presented by the patient, O for the clinical findings of the practitioner (objective data), A for the practitioner's assessment of health issues and P for the plan of care, which includes performed and prescribed procedures [7,8]. The problem list is composed of "active" and "inactive" health problems; a problem is considered to be active if it has the attention of the practitioners or of the patient, as reflected by present treatment, subsequent diagnostic investigations, disease monitoring, or the known progressive course of a disease [9,10]. The episode of care is defined as the time interval during which healthcare activities are performed by one healthcare provider to address one professionally defined health issue [11]. This concept supports the continuity of information, which in turn supports the continuity of care [12].

In addition, the use of standardised terminologies, associated with controlled vocabularies, is a prerequisite to achieve semantic interoperability of EHR information [2]. Standardisation improves the reliability of medical data, especially if the data are to be shared with other healthcare providers [6,13] or used for administrative functions or research [14]. Standardised data are also required to run clinical decision support systems [15].

In 2007, 87% of European general practitioners (GPs) were equipped with computers in their consultation rooms. In France, the level of computerisation has been estimated at 83%, varying from 78% in solo practices to 100% in group practices of four or more GPs. However, computers are only used (in any manner) in 66% and 72% of consultations by European and French GPs, respectively [16]. In the U.S.A. in 2007, only 35% of office-based physicians declared that they used EHR systems, which infrequently included a "full functional system" (4%) or even a "basic system" (12%). Furthermore, their use of any EHR system varied from 21% in solo practices to 74% in practices with 11 or more physicians [17]. Apart from the capital costs, the primary reported barrier for adopting EHR systems in ambulatory care was these systems' inadequacy for meeting physicians' needs [18].

It is now admitted that the actors involved should focus on increasing the adoption of robust EHR systems that allow the use of specific features, rather than simply deploying EHR systems regardless of their functionality [19]. Whereas an unprecedented effort is in progress to implement EHR systems worldwide, the capabilities of EHR systems are poorly understood (apart from decision support systems [20]), especially in primary care. Our objective was therefore to assess the main functionalities of the EHR systems used in French general practices.

2. Methods

2.1. Assessment data

Among the more than 20 EHR systems marketed in France [21], we included in the study the 15 systems that were used by more than 1500 GPs in the Provence-Alpes-Côte d'Azur region of southeast France. Each EHR system was assessed by one author (RS) between February and April 2009. We tested data entry according to two standard clinical vignettes describing virtual patient consultations (Box 1). Each EHR system was assessed in a general practice office over a 2-h period.

2.2. Assessment scale

The evaluation criteria were derived from the 1577 criteria of the EuroRec requirements for high-quality EHR systems [22]. Among them, we identified 353 relevant criteria using filters targeted on "good practice requirements", "general practice" and "data structuring". From this initial set of items, we removed 40 duplicates and selected both 25 criteria supporting the basic characteristics of general/family practice (first medical contact, bio-psycho-social model, continuity of care, coordination of care, public health) [23] and four criteria supporting data exchange. Five of these criteria were split up into subcriteria, so that the assessment scale finally included 37 criteria, organised into three sets: background data, consultation data, and exchange functionalities (Table 1). The entire selection process was achieved through consensus among three of the authors (DD, RS, LL).

2.3. Assessment score

As a general rule, two points were attributed to each criterion if a standardised specific field existed, one point if a non-standardised specific field existed, or zero points if a specific field was lacking. The way of scoring for all criteria is presented in Table 1. In this study, standardisation refers to the use of a controlled vocabulary (classification or dictionary), possibly associated with terminologies [2]. One point was attributed if a synthesis of the record could be exported and one additional point if the full record could be exported. One point was added if any classification system (ICPC-1, ICPC-2, ICD-10 or the French Dictionary of Consultation Results) [24–27] applied and zero point otherwise. We assessed the EHR systems according to each of the three sets of criteria (partial scores), with a maximal global score equal to 64 points. The results of the assessment are presented anonymously, along with the number of users of each EHR system. Spearman's test was used with SPSS® software [28] to determine a possible correlation between the global score and the number of users.