

Online Dissemination of Clinical Practice Guidelines as Narrative Texts and Structured Pathways: a Case Study with the Treatment of Type 2 Diabetes

Brigitte SÉROUSSI^{a,b,c,d,e,1}, Hector FALCOFF^f, Valérie ERTEL-PAU^g, Véronique RAIMOND^g, and Jacques BOUAUD^{h,a,b,c}

^a Sorbonne Universités, UPMC Université Paris 06, UMR_S 1142, LIMICS, Paris, France

^b INSERM, U1142, LIMICS, Paris, France

^c Université Paris 13, Sorbonne Paris Cité, LIMICS, (UMR_S 1142), Bobigny, France

^d AP-HP, Hôpital Tenon, Département de Santé Publique, Paris, France

^e APREC, Paris, France

^f Université Paris Descartes, Sorbonne Paris Cité, Département de médecine générale, Paris, France; SFTG, Paris, France

^g Haute Autorité de Santé, Saint-Denis-La-Plaine, France

^h AP-HP, DRCD, Paris, France

Abstract. Recently, National agencies in charge of the development of clinical practice guidelines (CPGs) have started to improve the usual narrative CPGs to provide guidance for different clinical pathways. In France, in conjunction with the development of the type 2 diabetes National CPGs, we have developed the system RecosDoc-Diabète which allows to interactively build a patient-centred pathway and get the appropriate recommendations. National narrative CPGs and RecosDoc-Diabète were published and made available online at the same time (February 2013). A questionnaire was provided to collect visitors' judgement about the system. Between February 12th and December 31st, 2013, 55,203 visitors accessed the narrative CPGs whereas 10,565 accessed the system. Among them, 186 (2%) responded to the questionnaire. One third of the comments were criticisms towards the CPG content. The system was globally positively evaluated although assessments were mixed illustrating that users' needs may be contradictory.

Keywords. Practice Guidelines as Topic, Guideline publication, Clinical Decision Support Systems, Type 2 Diabetes Mellitus

Introduction

Developed by health professional societies or National health agencies, clinical practice guidelines (CPGs) are usually textual documents expected to improve care quality and promote cost-effective practices. CPGs are widely disseminated and easily accessible through public web-based portals like the National Guideline Clearinghouse (NGC) of

¹ Corresponding Author.

the Agency for Healthcare Research and Quality in the United States, the Canadian Medical Association or CMA infobase, the National Institute for Health and Care Excellence (NICE) in the UK, or the “Haute Autorité de Santé” (HAS) in France. Because of state regulations newly formulated in most developed countries to guaranty patient safety and assure that high quality care is delivered, private companies have also started to penetrate the CPG market (UpToDate[®], MD Consult, Vidal, etc).

However, many barriers to the widespread adherence of clinicians with CPGs have been reported [1]. Despite they should theoretically support clinician decisions, CPGs are indeed extremely criticised and considered abstract, ambiguous, always incomplete, often out of date, and too simple or too complex to be applied to actual patients. Moreover, the sole dissemination of narrative CPGs has proven to have nearly no impact on physician behaviour. Indeed, when querying NGC, CMA, NICE, MD Consult, with the keyword “Diabetes”, we got 609, 71, 821, and 86 results respectively². All returns were narrative except the NICE guidance, which provides structured pathways similar to the scenarios of EON [3]. With UpToDate[®], the synthesis entitled “Overview of medical care in adults with diabetes mellitus” is about 20 pages long. Thus, finding which CPGs or which parts of CPGs are relevant for a patient condition may take a time often judged incompatible with the length of a medical consultation.

Several reviews [2] have suggested that since clinical decision support systems (CDSSs) are patient-centred, they are appropriate tools to promote CPG use. However, this requires that narrative CPGs be translated into formalized knowledge bases. This complex task is usually carried on once CPGs are published, thus with a delay and with no solution to correctly address the steps of “atomization”, “deabstraction”, “disambiguation” and “verification of completeness” [4] that knowledge modelling would require. Many authors have claimed that CPGs and their computerized counterpart should be developed as a unique process. In the same way, target CPG users require computerized supporting tools to be delivered at the same time [5,6].

In collaboration with the HAS, we have conducted an experiment to develop the structured formalization of CPG content while its authoring was still in progress [7]. This experiment has been handled on the development of the French CPGs for the therapeutic management of type 2 diabetes (T2D-CPGs). During this process, information exchanges have been made possible between knowledge modellers and CPG authors, improving the quality of both textual and structured versions of CPGs. The structured version of CPGs constitutes the knowledge base of a system named RecosDoc-Diabète, which provides pathways that can be interactively browsed online.

The aim of this paper is to present the results of the simultaneous diffusion of French T2D-CPGs both as narrative documents and structured pathways.

1. Material and Methods

Following the document-based paradigm first developed with OncoDoc [8], the content of HAS T2D-CPGs [9] was modelled and structured as a decision tree. Nodes represent patient criteria and are displayed along with the set of their possible values. Paths are clinical patient profiles for which recommended treatments are proposed at the leaf level. The decision tree is interactively browsed. While clicking at each step on the right value of criteria, the user dynamically selects the right pathway. When the leaf is

² Ressources accessed online on January 31, 2014

reached, the summary of the clinical condition (the list of all instantiated criteria) and the therapeutic advices associated to this pathway are displayed. Citations of the recommendations given in textual HAS CPGs are also provided. The RecosDoc-Diabète system is not a full CDSS since the verification of completion has not been performed in order to stick to the content of textual CPGs. In this way, the system is only a re-writing of HAS T2D-CPGs as a structured patient-centred version.

The publication of the new version of French T2D-CPGs was announced during a press conference by the CEO of the HAS accompanied by the head of the CPG department of HAS and the three project leaders. The HAS portal has been updated to integrate a page introducing the new CPGs³ and presenting the experiment with RecosDoc-Diabète with a link to the system⁴. On the home page of the system, instructions were given with a link to a tutorial. Some warnings were displayed, telling in particular that RecosDoc-Diabète is not a full CDSS and that the gaps existing in the narrative CPGs were reported in the knowledge base of the system. An open anonymous questionnaire was proposed, asking visitors to identify their profile (GPs, diabetologists, other specialists, other health care professionals), specify their type of practice (healthcare facilities, individual practice, group practice, health centers, coordinated care structures), characterize the context of their use of the system, assess its perceived utility and intent to use it, and, finally, collect their comments.

Visits were recorded through the servers' web logs and analysed with awstats v 0.7. Answers to the online questionnaire were stored from PHP scripts on the server, and exported to MS Excel for analysis. Free comments were analysed by the authors.

2. Results

Online traffic was observed for the T2D-CPG page of the HAS site and for the RecosDoc-Diabète system. Figure 1 provides the distribution of visits from the publication date on February 12th, 2013, to December 31st, 2013. The 10,565 system's visits correspond to 19% of the 55,203 CPG page visits. They ranged from 37% of CPG page access at the beginning of the period to around 10% at the end of the year. Most connections to the system (68%) originated directly from the HAS web site.

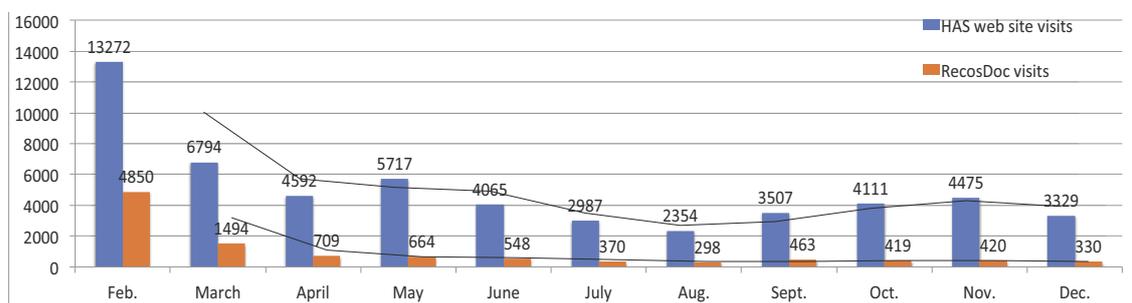


Figure 1. Monthly online visits of the T2D-CPG page and accesses to RecosDoc-Diabète (Feb.-Dec. 2013).

A total of 186 visitors (2% of the visits to RecosDoc-Diabète) responded to the online questionnaire. Table 1 characterizes respondents in terms of profession, years of practice, and type of practice. Many respondents were GPs (64%), most were

³ http://www.has-sante.fr/portail/jcms/c_1022476/fr/strategie-medicamenteuse-du-controle-glycemique-du-diabete-de-type-2

⁴ RecosDoc-Diabète is available online at <http://ics.upmc.fr/RecosDoc/diabete/> (in French)

healthcare professionals, and few were patients. One third declared an individual practice. Nearly half of respondents had more than 20 years of professional practice.

Table 1. Profiles of questionnaire respondents

Professions (n=184)	(%)	Years of practice (n=179)	(%)	Types of practice (n=178)	(%)
GPs	64%	< 5 y	21%	Healthcare facilities	21%
Diabetologists	6%	5–10 y	13%	Individual practice	30%
Other specialists	11%	10–20 y	18%	Group practice	26%
Other HC prof.	12%	> 20 y	47%	Health centers	4%
Diabetic patients	2%	—	—	Coordinated care structures	3%
Other	5%	—	—	Other	15%

Table 2 reports the answers obtained for the questionnaire. Most visitors (55%) used the system to consult CPG recommendations. It was used to get support for a given patient in 21% of the visits (synchronous: 9% ; asynchronous: 12%). Visitors' judgments were rather positive about the ease of use (87%), and usefulness for routine practice (88%). They also evaluate positively the structuration in pathways to understand narrative CPGs (86%). Most visitors (93%) declared they would use the system sometimes, often, or always. Considering the answers of the 147 physicians, there was no significant statistical association (Fisher's exact test) either with the professional category (GPs vs specialists), or with the years of practice (< 10 vs > 10).

Table 2. Distribution of answers to the questionnaire for the 186 respondents

Questions	(n)	Answers				
1. Context of use	185	CPG knowledge 55%	Training 22%	Consultation 9%	Case 12%	Other 3%
2. Easy to use	182	Disagree 2%	Tend to disagree 12%	Tend to agree 54%	Agree 33%	—
3. Useful for practice	183	Disagree 3%	Tend to disagree 9%	Tend to agree 50%	Agree 38%	—
4. Intent to use	182	Never 7%	Sometimes 45%	Often 38%	Always 11%	—
5. Useful for understanding	180	Disagree 3%	Tend to disagree 11%	Tend to agree 50%	Agree 36%	—

Among the respondents, 36% (n=67) entered free text comments. Ten could not be interpreted and 3 reported technical problems. On the remaining 54 comments, 17 were about CPGs content, among which 15 were criticisms. The other 37 comments were related to the RecosDoc-Diabète system: 9 were positive, 12 were negative, and 16 were suggestions of developments. Negative comments were: “the decision tree is too complex” (7), “it would be better if the decision tree was totally visualized” (3), “the method is not didactic” (1), and “medicine is an art and cannot be computerized” (1).

3. Discussion

Numerous studies have reported that guideline-based decision support may have an impact on practices when it is provided at the time and location of decision-making and as part of clinician workflow. However bodies in charge of the development of CPGs can only provide a synthesis of the state of the art as narrative documents with the poor impact on practices we know. The development of RecosDoc-Diabète is the first

experience handled by the HAS to provide CPGs in a structured format. Since the publication of CPGs, RecosDoc-Diabète has been accessed less frequently than the narrative CPGs. This can be explained by the poor visibility of the system on the web (badly Google-indexed, scarcely noticeable on the T2D-CPG HAS web page, new service not known by the regular visitors of the HAS website). However, accesses remained at a steady rate, which is an encouraging result. The analysis of the comments posted shows that about 30% of respondents (17/54) took advantage of the space offered to criticize HAS CPGs, found to be poorly evidence-based, essentially made of professional agreements, drug-centred, incomplete, and expressed at a high level of abstraction (using drug classes where commercial names were expected). Comments about the system were contradictory, some respondents found it too complex, others too simple which underlined that “One size does not fit all” with decision support, and that a given static system may not be suitable for both simple and complex patients, or to both expert and novice practitioners. Other respondents proposed to enrich the system with links to pedagogical documentation for patients, students or physicians. A few respondents ask to have RecosDoc-Diabète integrated within their EMR software, or developed as a smartphone application. Since few visitors, less than 1%, responded to the online questionnaire, this may not reflect the position of all visitors, which is a known bias of this kind of voluntary polling. Additional experiences of this kind should be carried on to help structuring clinical pathways and promote CPG implementation.

References

- [1] Flottorp S, Oxman A, Krause J, Musila N, Wensing M, Godycki-Cwirko M, et al., A checklist for identifying determinants of practice: A systematic review and synthesis of frameworks and taxonomies of factors that prevent or enable improvements in healthcare professional practice, *Implement Sci.* 2013;8(1):35.
- [2] Jaspers MW, Smeulders M, Vermeulen H, Peute LW, Effects of clinical decision-support systems on practitioner performance and patient outcomes: a synthesis of high-quality systematic review findings, *J Am Med Inform Assoc.* 2011;18(3):327–34.
- [3] Peleg M, Tu S, Bury J, Ciccarese P, Fox J, Greenes RA, et al., Comparing computer-interpretable guideline models: a case-study approach, *J Am Med Inform Assoc.* 2003;10(1):52–68.
- [4] Shiffman RN, Michel G, Essaihi A, and Thornquist E, Bridging the guideline implementation gap: a systematic, document-centered approach to guideline implementation. *J Am Med Inform Assoc.* 2004;11(5):418–26.
- [5] Goud R, Hasman A, Strijbis AM, Peek N, A parallel guideline development and formalization strategy to improve the quality of clinical practice guidelines, *Int J Med Inform.* 2009;78(8):513–20.
- [6] Shiffman RN, Michel G, Rosenfeld RM, Davidson C, Building better guidelines with BRIDGE-Wiz: development and evaluation of a software assistant to promote clarity, transparency, and implementability, *J Am Med Inform Assoc.* 2012;19(1):94–101.
- [7] Bouaud J, Falcoff H, Séroussi B, Simultaneously authoring and modeling clinical practice guidelines: a case study in the therapeutic management of type 2 diabetes in France, *Stud Health Technol Inform.* 2013;186:108–12.
- [8] Séroussi B, Bouaud J, and Antoine ÉC, OncoDoc, a successful experiment of computer-supported guideline development and implementation in the treatment of breast cancer, *Artif Intell Med.* 2001;22(1):43–64.
- [9] Haute Autorité de Santé, *Recommandation de bonne pratique - Stratégie médicamenteuse du contrôle glycémique du diabète de type 2*, January 2013. [Available at http://www.has-sante.fr/portail/upload/docs/application/pdf/2013-02/10irp04_reco_diabete_type_2.pdf - accessed Apr. 11th, 2014].