

# **Studies on Clinical Guidelines**

By

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## **1. Introduction**

The overall purpose of this project is to investigate the process of clinical practice guideline (CPG) development and use, with the aim of improving the design and utilization of information

in the guidelines. To this end, we present a scientifically-based framework and methods for the evaluation of guideline-based decision making in clinical and non-clinical medical settings.

Clinical practice guidelines (CPGs) are aimed at physicians with various degrees of knowledge and experience. The expected result of the use of guidelines is the standardization of clinical practice. However, CPGs can be semantically complex. In fact, many CPGs are composed of elaborate collections of prescribed procedures, sometimes involving the embedding of procedures within procedures or complicated temporal or causal relations among the various steps in a procedure. Furthermore, CPGs are often supported by evidence that may not match the way physicians support their clinical decisions. Consideration of the way physicians use evidence may provide important insights that serve to improve the design of CPGs so that they can be more widely accepted.

This report presents some formal methods of evaluating clinical practice guidelines and supporting documents. These include, methods of analysis of evidence interpretation and utilization and propositional and semantic network analysis (analysis of ideas and concepts and their inter-relations, respectively) for investigating the semantic and pragmatic complexity in the understanding of CPGs. Using these methods it is possible to evaluate various features of the guidelines: (a) understandability, (b) coherence, (c) ambiguity, and (d) the relationship between the written and the procedural aspects of guidelines.

In this report, we outline the main features of the methods with illustrative examples. The document presents four sections dealing with various aspects of guideline evaluation. First, we describe our cognitive framework for the study of the nature and utilization of evidence in clinical settings. Specifically, we present (a) a general model of evidence interpretation and utilization; (b) an experimental paradigm to study how individuals evaluate evidence; (c) a coding scheme based on a theoretical model for the classification of the nature of evidence and the strategies people use when evaluating information. Second, we provide a description of formal methods of analysis of representation of CPGs, based on semantic and pragmatic analysis of textual information. These methods are propositional analysis (i.e., analysis of ideas and concepts) and semantic network analysis (i.e., analysis of meaningful relationships between these ideas and concepts). In this section, we also present an analysis of a CPG and its representation in a computer language formalism, GLIF (GuideLine Interchange Format), using methods of propositional and semantic analyses. The guideline analyzed is titled "Screening for thyroid disease<sup>1</sup>," published by the ACP-ASIM. A preliminary comparison with a second CPG, "Pharmacological treatment of acute major depression and dysthymia" is given at the end of the section together with a summary of our current investigation on reasoning about depression by lay-people (including patients) and psychiatrists. Third, we report on two studies of clinical decision making with and without the use of CPGs. In this study, physicians with different levels of expertise solve a clinical scenario designed for managing diabetes (study 1) while using a

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<sup>1</sup> <http://www.acponline.org/journals/annals/15jul98/ppthyroid1.htm>

CPG<sup>2</sup> and screening thyroid disease (study 2), using the thyroid screening guideline analyzed in the third section. Finally, we give a description of studies of guideline usability at the “point of care.”

Given the aim of standardizing clinical practice and reducing variability, CPGs should be designed to optimize the understanding of the intended meaning of the guideline and to minimize the possibility of making incorrect inferences. The methods of cognitive evaluation presented in this document provide a formal way of identifying and characterizing the nature of any inferences that are generated (including incorrect ones). Problems can arise because of faulty interpretation of evidence or its utilization to make decisions, because of the semantic and pragmatic complexity of CPGs in either written or algorithmic formats, or because of difficulties in the translation of written guidelines into graphical or to computer-ready formats.

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<sup>2</sup> <http://www.cma.ca/cmaj/vol-159/issue-8/diabetescpg/index.htm>