

Improving Guideline Development and Implementation

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Summary: Over the past 15 years, there has been a lot of focus on developing, disseminating, and implementing clinical practice guidelines. A number of shortcomings— including challenges in the authoring process, quality defects in the production of guidelines, and obstacles to effective implementation— in the process of translating medical knowledge into systems that influence clinical behavior have been identified. Although systematic reviews have demonstrated that computerized systems can implement guidelines effectively in clinical practices, creating computer-mediated guideline implementation systems has also proven to be onerous and not uniformly successful.

Dr. Richard Shiffman and his research team at Yale University designed a research program on the effective representation of guidelines using ontologies. This study was designed to reduce guideline ambiguities, improve efficiency, and create and evaluate tools to facilitate the writing of comprehensive and implementable guidelines. The first generation of the software assistant Building Recommendations in a Developer's Guideline Editor (BRIDGE-Wiz) was developed in the earlier years of the project. It has been used in four guideline development efforts and has yielded good results. BRIDGE-Wiz formalizes and systematizes a process for creating implementable guideline recommendation statements. The tool takes a wizard approach to answering questions (such as under what circumstances, who, what level of obligation, purpose, and to whom, how, and why?). Natural language processing was applied to create and populate a template for recommendation statements. Overall, users found that BRIDGE-Wiz facilitated the development of clear, transparent, and implementable guideline recommendations. The findings from this program will promote an understanding of how to improve knowledge acquisition. In addition, the conclusions will help authors make precise and comprehensive guidelines in an unambiguous manner.

Project Objectives:

- Create a library of representative guideline recommendation statements that will be used to better understand and characterize the current corpus of guideline statements and to serve as a resource for modeling and evaluation activities. **(Achieved)**
- Delineate the range of ambiguous, vague, and underspecified language in recommendation statements and devise targeted remedies. **(Achieved)**
- Analyze the terminology of obligation (deontic components) used in guideline recommendation statements to understand how this concept can be applied most effectively. **(Achieved)**
- Create ontology of recommendations. **(Achieved)**
- Develop and evaluate a controlled language editor for use by domain experts to facilitate authoring of recommendations that can be translated into decision support tools. **(Achieved)**

2011 Activities: The first generation of BRIDGE-Wiz was developed in the earlier years of this project and,

to date, has been used in more than seven guideline development efforts with good results. The focus of activities in 2011 was on evaluating and refining the system, developing and evaluating a “what you see is what you mean (WYSIWYM)” interface, and developing the final report. Several professional organizations, including the American Academy of Pediatrics and the American Academy of Otolaryngology Head and Neck Surgery, have incorporated BRIDGE-Wiz in their standard guideline development process. This WYSIWYM interface is expected to be used by domain experts to facilitate authoring of recommendations that can be translated into decision-support tools to enhance the accuracy of translation and ease implementation of new knowledge contained in guidelines.

The project team translated a set of guideline recommendation statements into Attempto Controlled English (ACE). ACE texts are computer-processable and can be translated unambiguously into discourse representation structures, a syntactic variant of first-order logic.

A contract extension allowed the project team to complete the final report. A project-related paper, [“Building better guidelines with BRIDGE-Wiz: a software assistant to promote quality, transparency, and implementability.”](#) was published in 2012.

Preliminary Impact and Findings: The team found that ACE can be used to express clinical practice guideline recommendations and ACE statements were judged to be acceptably “natural”-sounding. Principles identified can be used to improve the quality, clarity, and implementability of clinical practice guidelines. This represents some of the first work using controlled natural language in health care.

Target Population: General

Strategic Goal: Develop and disseminate health IT evidence and evidence-based tools to improve health care decisionmaking through the use of integrated data and knowledge management.

Business Goal: Knowledge Creation
