# Using PICO to Align Medical Evidence with MDs Decision Making Models

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## Abstract

*Modern medicine is characterized by an "explosion" in clinical research information making practical application of Evidence-Based Medicine (EBM), problematic for many clinicians. We have developed a PICO-(evidence based search strategy focusing on Patient/Population, Intervention, Comparison and Outcome)-based framework for (indexing and retrieving medical evidence and we posit that the use of PICO allows for organizing evidence that is aligned with an MD's decision making model. We describe a study where medical students evaluated our PICO-based approach and results show that students are eager to apply EBM but are hindered by a lack of specialist skills. Students reported that the PICO-based framework for organizing evidence provided an intuitive way of accessing and evaluating evidence and would be useful for their clinical tasks.*

### Keywords:

Evidence-Based Medicine, PICO, Information Retrieval.

## Introduction

Advances in clinical research and dissemination via the Internet has caused an unprecedented growth in published medical evidence, for example, the number of drug therapy review articles on PubMed increased by 10,521% from 1966 to 2003 [1]. Studies have shown that clinicians have yet to fully capitalise on freely accessible online databases (e.g. PubMed, Cochrane Library), with common grievances including lack of familiarity with databases, lack of knowledge on how to construct effective queries, difficulty tracking down evidence quickly and the need to switch from a current task to interact with an evidence repository [2]. In this work we posed the question: "Can PICO be used to effectively organize (index and retrieve) evidence so it may be easily accessed and evaluated by MDs to support clinical tasks?"

## Materials and Methods

In previous work [3] we have presented an information retrieval application that employs the PICO method [4] to index and retrieve systematic reviews from The Cochrane Library for presentation to an MD during a clinical encounter. First, PICO elements (patient-, diagnosis-, and treatment-related attributes) are identified in systematic reviews and applied as focused index terms to better describe document content in terms of concepts collected during a clinical encounter and employed by an MD's decision making model.

Second PICO is used to formulate directed queries using data automatically gathered during the clinical encounter (patient-, diagnosis-, and treatment-related attributes), and to retrieve and present evidence ranked by similarity to the query.

We executed our evidence retrieval application to retrieve systematic reviews for pre-defined clinical encounters and built a web application to present encounters and evidence, and to survey 13 medical students from Ireland and Canada.

## Results

10/13 students stated that PICO elements identified in systematic reviews and applied as index terms were accurate. When asked if retrieved reviews were more relevant for clinical encounter descriptions or PICO index terms, 2 said they were more relevant for the encounter descriptions, 4 said they were more relevant for PICO descriptions, and 5 said the reviews were equally relevant for both representations. This indicates that a majority of students believed that information was not lost by the conversion to PICO, that PICO terms can be used to correctly abstract pertinent information from detailed clinical data, and is effective for formulating focused queries for retrieving evidence. All students stated the application would enable better retrieval of evidence during consultations, that the presentation of evidence was intuitive, and 10/11 stated it would save time searching for evidence.

## Conclusion

Our PICO-based method can help better organize medical evidence by indexing it to emphasize pertinent aspects of a clinical encounter and thus by retrieving evidence that is aligned with an MD's decision making model.

## References

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