Optimal search strategies for identifying moderators of treatment outcome in PubMed

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Background: Treatments are becoming increasingly personalized in recognition that treatment effects differ from individual to individual. Implementing personalized care may have significant benefits for the individual patient and society as a whole. Retrieving existing evidence on moderators of treatment effects may be a first step towards personalized care but is a daunting task without a specialized search strategy.
Objectives: To generate and evaluate a search query in PubMed to find articles identifying moderators of treatment effects.
Methods: Four top-ranked journals from the field of rheumatology and two general medicine journals were hand-searched for articles reporting on moderators of treatment effects yielding a 'gold standard' (limits: published in 2011, English language). Selected articles were randomly allocated to a development and a validation set. PubReminer was used to retrieve keywords and MeSH-terms linked with the 'gold standard' articles in the development set. Terms were tested for retrieval accuracy (e.g. sensitivity (Se) and specificity (Sp)) within the development set. Preselected 'core terms' and *de novo* single terms that yielded Se>25% and Sp>75% were used to generate combined search queries. The best search queries were tested in the validation set.
Results: Of 4407 articles, 198 were considered to report on moderators of treatment effects. The 97 articles in the development set yielded 1231 keywords and 1253 MeSH-terms. The most sensitive query is: '("Epidemiologic Methods"[MeSH] OR ASSIGN* OR CONTROL*[tiab] OR TRIAL*[tiab]) AND THERAPY*[sh]' (Se 100%, Sp 79%), the most specific query is: 'GROUP*[tw] AND THERAPY*' (Se 75%, Sp 95%). In the validation set these queries yielded values of (Se 89%, Sp 80%) and (Se 58%, Sp 95%), respectively.
Conclusions: We developed narrow and broad search queries to be used according to search requirements. These preliminary queries represent the first step in making it easier to retrieve evidence on moderators of treatment effect on the road towards implementing personalized care.