Reviewer's report

Title: Pretest expectations strongly influence interpretation of abnormal laboratory results and further management

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Reviewer: Peter Wyer

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GENERAL

This is an original and useful investigation that pertains to how primary care practitioners interpret a subset of lab tests that they order on patients for purposes of investigating the possibility of specific disease entities or conditions. Specifically it looks at the question of the relationship between the level of pretest suspicion and the response to differing magnitudes of abnormality in tests characterized by continuous ranges of possible results. This reviewer is unaware of previous studies organized in this fashion and is therefore impressed by the originality and usefulness of such a study performed in actual point-of-care settings and using a substantial cohort practitioners and patients. Since practitioner behaviour is the subject of the study, the unit of action is the individual practitioner and the effective “N” of the study is therefore 87, not 1253. This could reduce the power of the study, depending upon how the analysis was performed. I assume a meth/stats consultant will be submitting a review that addresses relevant aspects of the approach to analysis. Nonetheless, this is an impressive effort and should yield a valuable contribution to the literature. The weakness of the manuscript is primarily presentation. It is not until the reader is well along in a detailed scrutiny that the true focus becomes completely clear and that the strength of the methodology is revealed. Comments below seek to elaborate on this.

MAJOR WEAKNESSES THAT NEED TO BE ADDRESSED

Beginning with the abstract, the true focus of the study is unclear in the presentation and does not become clear until the reader is substantially into the methods section. The objective stated here is also at odds with the objective as stated at the very bottom of P 3, which appears to reflect the actual objective of the study.

The abstract states the objective to be to “examine the influence of pretest probability estimates and reasons for ordering tests on test result interpretation and further management”. This is very misleading and it is not until much later in the article that the reader discovers that patients whose test were ordered for reasons other than testing a specific diagnostic hypothesis were EXCLUDED from the study! The Methods segment of the abstract is much too sparse and does not allow the reader to determine what the study was really about. Much of
the results section appears to emphasize results tangential to the true objective of the study being reported. Likewise with the conclusion. Is it possible that this report is a ‘spinoff’ of a larger study and that the abstract of the original was only partially adjusted? If true, this does not invalidate this report but it should be clearly stated if this is the case.

The introduction similarly wanders through multiple aspects of testing in primary care settings and only at the very end settles down to a more nearly clear statement of the “true” objectives of the study. A much more focused intro would confine itself to tests ordered for the purpose of either confirming or refuting specific diagnostic hypotheses and would address the difference between a dichotomized diagnostic result (positive or negative) and a continuous variable with respect to the approach to interpretations and actions by non academic clinicians.

The Methods elaboration settles down to a fairly focused and consistent description of a study restricted to the issue of testing in relationship to specific disease hypotheses. Because of the unclarity of the earlier portion of the manuscript, the statement at the bottom of P 5, that patients for whom tests were ordered for reasons other than hypothesis testing were excluded, comes as a surprise to the reader and might even be entirely overlooked.

MINOR WEAKNESSES

In general, the methods would be illuminated substantially if the actual survey form administered to the practitioner subjects were provided with the report. As examples of this:

P. 5, Par 2: In connection with the query “Do you suspect a disease?” were the subjects asked to name the particular disease they suspected. If not, the classification of the test ordering behavior might have been subject to ambiguity.

P. 5, Par 4: in line with the preceding query, was there any control on whether the disease being suspected at the point of the post test survey was the same disease being suspected at the point of the pre test survey?

P. 5, Par. 5: This aspect of your inquiry appears plausible and potentially useful but could be explained more clearly here and elsewhere. I.e. you were apparently trying to classify and tabulate the ‘psychologies of anticipated action/management’ associated with practitioners pre test probability estimates when specific diseases were in question. Implicitly, these pretest estimates therefore were tied to anticipated results. E.g. “I think the likelihood is very low and expect that the test result will be normal or near normal. I therefore perceive myself to be ordering the test for purpose of ‘reassurance’.” A potentially hidden variable here is the extent to which patient anxiety/apprehension played an independent role in motivating the ordering of the test. Was there any attempt to assess this aspect of the process?

P. 9-10. Your discussion of the implications of your findings might be enhanced if you supplemented your reference to Bayesian theory with acknowledgment of
the less abstract concept of likelihood ratios associated with continuous diagnostic test results as direct measures of impact of test results on pre-test probability. As a test result moves continuously towards more extreme values, the likelihood ratio also continuously increases. Hence, the clinicians’ instincts and trends towards interpretation and action that you observed are concretely in line with this simple numerical principle and with the previous literature on this subject.1-3 Furthermore, use of this concept does not require calculations but only an understanding of the principle and simple rules of thumb regarding interpretation of likelihood ratios within certain ranges.


**Level of interest:** An article of importance in its field

**Quality of written English:** Needs some language corrections before being published

**Statistical review:** Yes, but I do not feel adequately qualified to assess the statistics.

**Declaration of competing interests:**

I declare that I have no competing interests.