Post-test Probability According to Prevalence

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Authors Reply: We described a scenario of a highly accurate screening test in which we randomly manipulated the prevalence of the disease (i.e. pre-test probability).[1] The estimation of post-test probability was possible for all arms of the study except one, in which no information on prevalence was provided. As pointed out by Galen, the option "cannot be determined" was not proposed to that group, because we wanted to use the same response scale for all versions of the scenario. Instead, we expected a higher rate of missing answers, but this did not happen. In fact, for about 90% of physicians, the estimation of post-test probability was not influenced by disease prevalence, whether it was provided or not.

We agree with Galen that computing the post-test probability of disease may be cumbersome and of limited usefulness for everyday diagnosis at the bedside. However, the aim of our study was not so much to test the exact arithmetic skills necessary for Bayesian calculations, for which many aids exist, but rather to assess whether physicians are aware of the relationship between pre-test and post-test probability when confronted with the result of a diagnostic test. We expected that respondents would adjust the range of their post-test estimation according to a prevalence varying between 1% and 95%. To our surprise, most physicians seemed to consider that diagnostic testing yields a fixed probability that characterizes the test's performance.

Ignoring the importance of pre-test probability when interpreting test results could result in unnecessary testing, patient anxiety, and even diagnostic errors. For example, without going as far as computing the exact post-test probability, it would be incorrect to rule out pulmonary embolism on the basis of a negative D-Dimer test when the pre-test probability is high.[2] It is true that well conceived clinical guidelines can incorporate Bayesian principles into their proposed algorithms, but it is important that physicians remain aware of the reasons that underlie these recommendations. Moreover, this knowledge is crucial for the assessment of the numerous new diagnostic tests that are regularly brought to their attention.

We believe that our results should prompt the exploration of new approaches for teaching Bayesian principles and their implementation in clinical practice. New didactic models have been proposed[3], as well as a wider use of graphical reporting of diagnostic information.[4] However these new decision aids will go to waste if doctors do not even realize that they may need them.

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