

# **Which test to perform? Modeling utility of medical tests: information gain, patient risk and financial costs**

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**Abstract:** In medical diagnosis, as in many cognitive domains, asking the right questions is crucial. Medical tests differ not only in the type of information they provide, but in their financial costs and physical risks to a patient. We develop a model that combines informational and cost constraints, describing specific medical scenarios of a patient with realistic symptoms. We then define a finite number of existing medical tests that are available in this situation. The tests differ in their sensitivity and specificity concerning different possible underlying diseases as well as in their financial costs and the physical risks they pose to a patient. Combining these, we compare the utilities of the different tests if performed alone as well as if performed in combination. We show how purely informational considerations are not adequate for the analysis of such a scenario; test costs and patient outcomes must also be taken into account.