

Homework 1

Sept. 21, 2023

- Suppose there is a newly discovered disease of prevalence 10^{-6} . There is a test for the disease with sensitivity 100% and specificity 99.99%. The disease has no symptom at the early stage but can become serious later. A costly treatment is available at the early stage but the treatment has strong side-effects. For some reason you are worried about having the disease. Try to make the decision in the following two scenarios:
 - a) The disease does not transmit from person to person. Will you take the test? Why? (Please calculate the probability that you really get the disease if being tested positive, and discuss your reasoning for your decision of taking or not taking the test.)
 - b) If the disease is infectious and can be transmitted easily across family members and close friends. Will you take the test? Why? What will you do if you are tested positive? (Hint: You may introduce extra conditions or assumptions if they can help to make better decision. There may not be a single unique “correct” decision. The homework will be evaluated based on whether your calculation and reasoning is correct in the sense of what we learned in Chapter 2.)

Due date: Sept. 27 (Wed.) 23:59 Beijing time