

Additional Examples – Solutions

Question 1

The Sensitivity is 97.9%, Specificity is 95.2%, PPV = 90.2%, NPV = 99.0%

Test appears very effective – high sensitivity and specificity, with good predictive value within this population (NB this latter aspect may change in a different population with lower prevalence – here = 0.31, as this is a selected high-risk group).

Question 2

- A. False – individuals “with” the disease.
- B. False – proportion of those who have a positive test who have the disease.
- C. False – NPV depends on prevalence, and will decrease if prevalence increases
- D. True – this will identify as many people with the disease as possible, so is a sensible strategy.
- E. True – LR+ looks at ratio of positive test probability in disease case relative to non-disease case.

Question 3

- a) Method 1 would correctly detect more patients – it has higher sensitivity.
- b) False positives are test results indicating Chlamydia, when the disease is absent. Method 2 has 100% specificity, so when disease is absent, it will always say negative – i.e. never detect a positive, so has a 0% false positive rate. Thus Method 1 (with slightly lower specificity) has the higher false positive rate (although not by much).
- c) Method 1 gives a better estimate of the population prevalence, because it has a better balance of sensitivity and specificity, so is likely to be preferred here.

Question 4

Point C would give the type of test required. As this point has high sensitivity, a patient about to suffer an AMI is highly likely to give a positive result in the test. Thus, a negative test result is more likely to mean that AMI is unlikely to occur. Obviously, this point has low specificity, which means that the false positive rate is going to be higher, but this group of patients can undergo further testing to reveal whether or not AMI is occurring, and so there is less danger here than in missing an AMI completely (an error in the other direction).