Some (Optional) Additional Examples

Question 1 (adapted from http://www.medstatsaag.com/)

A simple routine test for the presence of HIV was carried out on 300 high risk subjects (intravenous drug users). A more accurate but time-consuming and expensive test (the 'gold standard') was also carried out on the subjects to assess the accuracy of the routine test. The following results were obtained:

		HIV by 'gold standard'		
		Yes	No	Total
Routine test	+ve	92	10	102
	-ve	2	196	198
	Total	94	206	300

Calculate the sensitivity, specificity, PPV and NPV of this test.

The data are stored in Learn as a comma-separated values file: ***HIV.csv***
The routine test variable is coded (0 = negative, 1 = positive)
The gold standard result is coded (0 = No, 1 = Yes).

How would you characterise the performance of this diagnostic test?

Question 2 (adapted from http://www.medstatsaag.com/)

Are the following statements true or false?

A. The sensitivity of a diagnostic test is the proportion of individuals without the disease who are correctly identified by the test.

B. The positive predictive value of a diagnostic test is the proportion of individuals with the disease who are correctly identified by the test.

C. The negative predictive value of a diagnostic test will not change if the prevalence of the condition increases.

D. For a condition that is easily treatable, we should like the diagnostic test to have a high sensitivity.

E. The likelihood ratio for a positive diagnostic test result is the ratio of the chance of a positive result if the patient has the disease to the chance of a positive result if he/she does not have the disease.

Question 3 (adapted from http://www.medstatsaag.com/)

The potential of two methods to function as a screening tool for the detection of Chlamydia was assessed in 890 women aged 18-35 years (Grun L *et al*. BMJ 1997; 315: 226-230). Method 1 was the ligase chain reaction, and Method 2 was based on enzyme immunoassay.

The prevalence of confirmed Chlamydia infection was 2.6% (95% CI 1.6 to 3.6%) in all women.

The performance of the two methods was summarised as follows:

Method	Estimated Prevalence	Sensitivity	Specificity
1	2.5% (1.5% to 3.9%)	90%	99.8%
2	1.6% (0.8% to 2.7%)	60%	100%

a) Which of the methods would correctly detect more patients with Chlamydia?

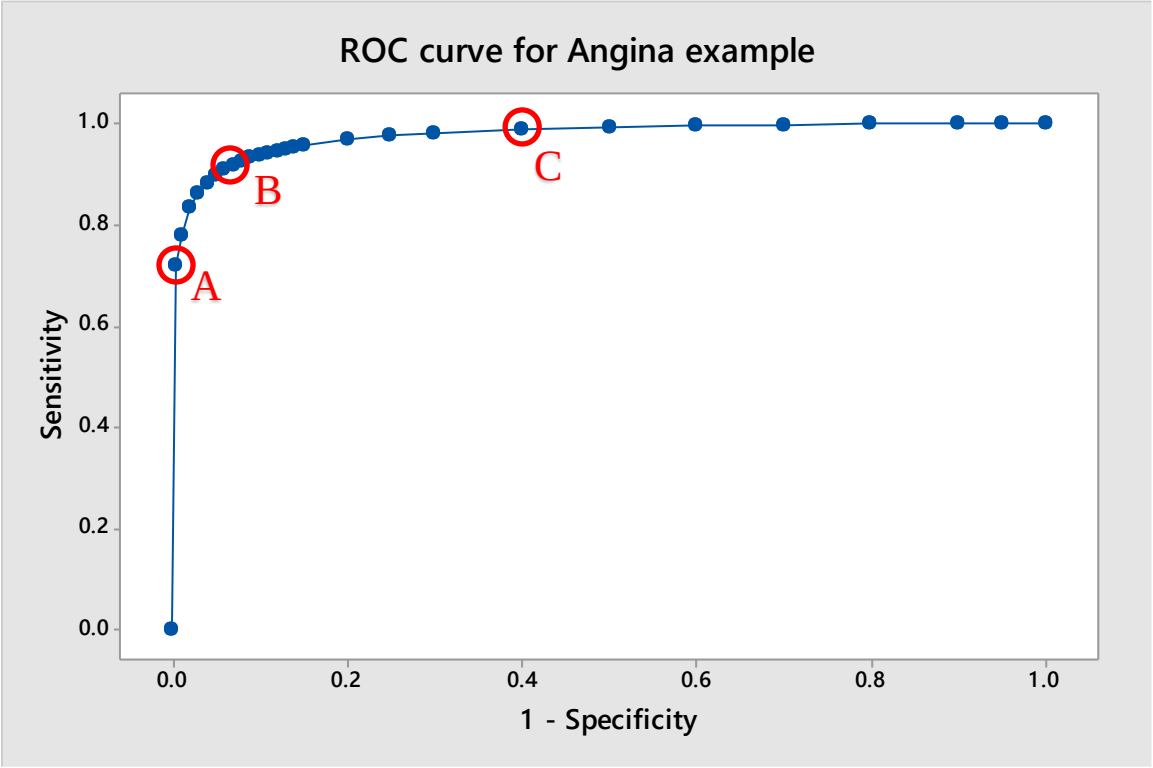
b) Which method would detect more false positives?

c) Does the testing suggest which of the 2 methods would be preferred here?

Question 4

A recent study examined creatinekinase (CK) in 120 hospital patients suffering from unstable angina (less serious, n = 93) or acute myocardial infarction (AMI - very serious, n = 27). The investigators produced the ROC curve below, with the aim of determining whether CK could be used to detect patients who are about to suffer an AMI. (You have just examined these data in the practical exercise…)

Given AMI is so serious, and because the patient population would normally be expected to be in hospital for testing, they judged that they wished to design a test that would be a "rule-out" test – one that would be highly efficient in terms of the ability to say that a patient would be unlikely to go on to develop AMI, but would accept a higher proportion of false positives. Given this requirement, which point in the ROC curve below do you think they should choose to construct their screening approach?



Point	Sensitivity	Specificity
A	0.72	0.99
B	0.91	0.94
C	0.99	0.60