Deacon's Challenge No. 68 Answer

The following results were obtained for two different serum samples:

	Sample 1	Sample 2
Measured calcium (mmol/L)	1.85	2.52
Albumin (g/L)	23	52

Stating any assumptions you make, use these data to derive an expression to "adjust" serum calcium to a "normal" albumin concentration of 40 g/L.

Although there are only two results, if we assume that measured calcium is linearly related to albumin over this range, then the slope can be estimated:

$$\text{Slope} = \frac{\text{Change in measured calcium}}{\text{Change in albumin}} = \frac{2.52 - 1.85}{52 - 23} = \frac{0.67}{29} = 0.023 \text{ mmol/g}$$

Therefore for each 1g/L increase in albumin, measured calcium also increases by 0.023 mmol/L. Therefore, to "correct" a measured calcium concentration to the value expected if the albumin was "normal" (40 g/L), the *difference* between the measured albumin and 40 g/L is multiplied by 0.023 then *added* to the measured calcium:

Corrected Ca (mmol/L) = Measured calcium (mmol/L) + 0.023 (40 - albumin, g/L)

If the albumin is *greater* than 40 g/L, then the expression 0.023 (40 – albumin) becomes negative so that its value is *subtracted* from the measured calcium. ■

Question 69

A disease has a prevalence of 10 per cent in the population being tested. A diagnostic test was applied to a random sample of 200 individuals from this population and yielded 15 true positive and 15 false positive results. Calculate a) the pre-test odds of disease being present in a an individual being tested, b) the likelihood ratio positive of the test, and c) the post-test odds of disease for a patient with a positive result.