Question 1: Sensitivity − Specificity

You are working in a pediatric clinic with an experienced pediatrician. You examine 50 children whose parents are concerned about the possibility of ear infection. You believe that 15 children have red and bulging tympanic membranes consistent with otitis media (OM). The pediatrician examines these same children and makes a diagnosis of otitis media in 25 children. The pediatrician agrees that 10 of your 15 diagnoses of children with otitis media are correct. Fill in the 2x2 table below.

	Pediatrician (gold standard)		Total
	Otitis Media (+)	No Otitis Media (-)	
Physical Examination			
Otitis Media (+)			
No Otitis Media (-)			
Total			

Question 1.1: Calculate and interpret the sensitivity of your examination.

Question 1.2: Calculate and interpret the specificity of your examination.

Question 1.3: Calculate and interpret the chance that your diagnosis of Otitis Media is correct (PPV).

Question 1.4: Calculate and interpret the chance that your diagnosis of normal eardrum is correct (NPV).

Question 2: Sensitivity − Specificity

You are provided with a sensitivity and specificity table for a new very quick and easy nasal swab to detect type 2 diabetes. 100 people are tested for the disease with the gold standard measure and the new nasal swab measure. According to the gold standard measure, 15 people have the disease; 85 people are not diseased. The new swab-based measure suggests that 10 people have diabetes and 45 people do not have diabetes. Construct the 2x2 table for this example.

Question 2.1: Calculate and interpret the sensitivity of your examination.

Question 2.2: Calculate and interpret the specificity of your examination.

Question 2.3: Calculate and interpret the chance that the swab-based diagnosis of diabetes is correct (PPV).

Question 2.4: Calculate and interpret the chance that the swab-based diagnosis of diabetes is correct (NPV).

Question 3: Sensitivity − Specificity

This time we use the same test as in Question 2, but in a different population, with a disease prevalence of 30%. - Prevalence of Disease: $30/100 \times 100 = 30\%$

We maintain the same sensitivity and specificity because these are characteristics of this test. - Sensitivity: $A/(A + C) \times 100$ $20/30 \times 100 = 67\%$ - Specificity: $D/(D + B) \times 100$ $37/70 \times 100 = 53\%$

Question 3.1: Calculate the PVV and NPV for the same test with a high prevalence. Interpret changes in the PVV and NPV comparing questions 2.3 and 2.4 to this answers you get in answering this question.