

Module 1 Task 1

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$$\begin{aligned}\text{Sensitivity} &= 99.5\% = P(t+ | F+) \\ \text{Specificity} &= 99.5\% = P(t- | F-) \\ \text{Prevalence} &= 5\% = P(F+)\end{aligned}$$

$$P(F+ | t+) = \frac{P(t+ | F+) \cdot P(F+)}{P(t+)} = \frac{P(t+ | F+) \cdot P(F+)}{P(t+ | F+) \cdot P(F+) + P(t+ | F-) \cdot P(F-)}$$

$$= \frac{P(t+ | F+) \cdot P(F+)}{P(t+ | F+) \cdot P(F+) + (1 - P(t- | F-)) \cdot (1 - P(F+))} = \frac{0.995 \cdot 0.05}{0.995 \cdot 0.05 + 0.005 \cdot 0.95} = \frac{0.04975}{0.0545}$$

$$= 0.913 = \underline{\underline{91\%}}$$