A, B P(A) P(B)

$$P(A/B) = \frac{P(B/A) \cdot P(A)}{P(B)}$$

$$P(A/B) = \frac{P(A \cap B)}{P(B)}.$$

$$\Rightarrow P(A \cap B) = P(A/B) \cdot P(B)$$

$$P(B/A) = \frac{P(B \cap A)}{P(A)}$$

$$\Rightarrow P(B \cap A) = P(B/A) \cdot P(A).$$

$$P(A/B) \cdot P(B) = P(B/A) \cdot P(A)$$

$$P(A/B) = \frac{P(B/A) \cdot P(A)}{P(B)}$$

Posterior Prior

→ A - Covid 19 P(A) - 0.001

→ B - PCR +

- True Positive - 98%
- True Negative - 97%

$$P(A/B) = \frac{P(B/A) \cdot P(A)}{P(B)}$$

$$= \frac{0.98 \times 0.001}{P(B)}$$

$$P(A/B) = 0.00098 / P(B)$$

$$P(\sim A/B) = \frac{P(B/\sim A) \cdot P(\sim A)}{P(B)}$$

$$= \frac{0.03 \times 0.999}{P(B)}$$

$$P(\sim A/B) = 0.03 / P(B).$$

$$= P(A/B) \leq 0.000098 / P(B)$$

$$P(\sim A/B) \leq 0.03 / P(B).$$

$$P(x) = 1/3 \qquad P(y) = 2/3$$

$$P(x) = \frac{P(x)}{P(x)+P(y)} = \frac{1/3}{1/3+2/3} = 1/3$$

$$P(A/B) \leq \frac{P(A/B)}{P(A/B)+P(\sim A/B)}$$

$$= \frac{0.000098 / P(B)}{0.000098 / P(B) + 0.03 / P(B)}$$

$$P(A/B) \Rightarrow \frac{0.00098}{0.03098}$$

$$P(A/B') \leq \frac{0.00098}{0.03}$$

$$\therefore P(A/B) \geq 0.03 \rightarrow$$

$$P(\sim A/B) \leq 0.97$$