

28. Solution: A

Let

C = Event that shipment came from Company X

I_1 = Event that one of the vaccine vials tested is ineffective

Then by Bayes' Formula,
$$P[C | I_1] = \frac{P[I_1 | C]P[C]}{P[I_1 | C]P[C] + P[I_1 | C^c]P[C^c]}$$

Now

$$P[C] = \frac{1}{5}$$

$$P[C^c] = 1 - P[C] = 1 - \frac{1}{5} = \frac{4}{5}$$

$$P[I_1 | C] = \binom{30}{1}(0.10)(0.90)^{29} = 0.141$$

$$P[I_1 | C^c] = \binom{30}{1}(0.02)(0.98)^{29} = 0.334$$

Therefore,

$$P[C | I_1] = \frac{(0.141)(1/5)}{(0.141)(1/5) + (0.334)(4/5)} = 0.096$$