# Response to the Multiple Choice Question

## Question: The article gives a p-value of .04. Is this interpretation valid or invalid: "The probability that the drug is not effective."

## Answer: (B) Invalid

This interpretation is invalid because it fundamentally misrepresents what a p-value measures. A p-value is the probability of obtaining a test statistic at least as extreme as the one observed, assuming the null hypothesis is true. It is NOT the probability that the null hypothesis itself is true.

The statement "The probability that the drug is not effective" incorrectly frames the p-value as a direct statement about the truth of the null hypothesis (that the drug has no effect). This represents a common misinterpretation known as the "inverse probability fallacy" or "prosecutor's fallacy."

The correct interpretation would be: "Assuming the drug has no effect on vision loss (null hypothesis), the probability of observing the results we did, or results more extreme, is 0.04."

The p-value provides evidence against the null hypothesis but does not directly quantify the probability of the null or alternative hypothesis being true. That would require a Bayesian approach with prior probabilities.