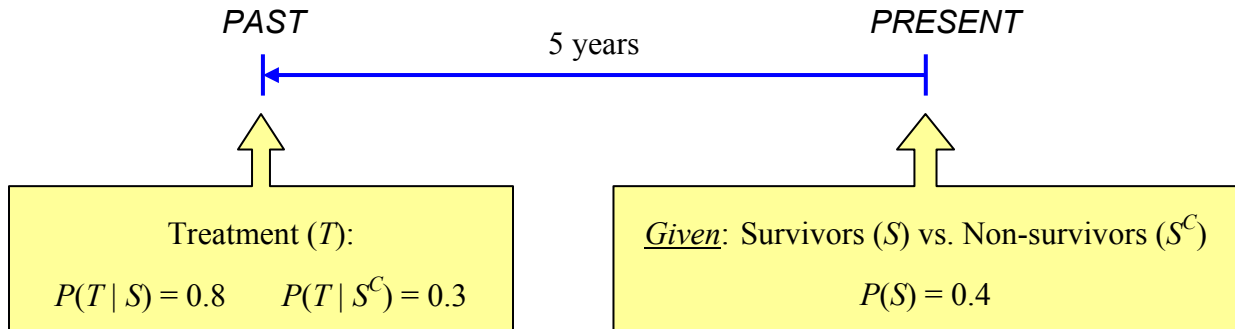


4. On the basis of a retrospective study, it is determined (from hospital records, tumor registries, and death certificates) that the overall five-year survival (event S) of a particular form of cancer in a certain population has a **prior probability** of $P(S) = 0.4$. Furthermore, the conditional probability of receiving treatment (event T) among the survivors is given by $P(T | S) = 0.8$, while the conditional probability of receiving treatment among the non-survivors is given by $P(T | S^C) = 0.3$. From this information, calculate the following **posterior probabilities**.



- (a) Probability of survival among treated individuals, $P(S | T)$ (4 pts.)
- (b) Probability of survival among untreated individuals, $P(S | T^C)$ (4 pts.)
- (c) Compare the prior probability above with each of these posterior probabilities, and briefly interpret. (3 pts.)
- (d) Calculate the **odds** of survival, *given treatment*. (3 pts.)
- Calculate the **odds** of survival, *given no treatment*. (3 pts.)
- Calculate the overall **odds ratio** of survival for this disease. (3 pts.)