

Sample Exercise

Teaching Pack: Building Decision Trees

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CHILD SURGERY IN WAR TORN REGION

Note: This is a hypothetical clinical example created for pedagogical reasons and not based on data.

For children in an unstable war-torn region, there is limited medical and surgical care available and antibiotics are scarce. You have been asked to advise MSF on guidelines to manage a child presenting with a severe large complicated peritonsillar abscess in an unstable region. Based on the information provided, the probability of mortality with immediate surgery in this region (e.g., poorly equipped center, no blood bank, few supplies, and limited access to a trained surgeon) is 10%. Delaying surgery with temporizing oral antibiotics and drainage is the other option. There is a 30% chance this will fail, the child will decompensate and become even more critically ill, and urgent surgery will then be even riskier with a 15% mortality rate. There is a 70% chance, however, that delaying surgery will buy time and stabilize the child. Of the children who are stabilized, about 25% will recover with no sequelae. The other 75% will not completely recover, but you will have adequate time to evacuate the child to a safe zone, so that they can undergo surgery in better conditions. The child in this latter scenario could then undergo a surgical procedure with a much-reduced mortality rate of 3% due to access to appropriate care. Assume those who survive surgery fully recover.

- Construct a decision tree and using the information you have been provided, conduct a baseline analysis of the two main alternatives. Calculate the expected value (i.e., probability of survival) for each option. Provided your objective is to maximize survival, which alternative would you choose? Show your work.
- What do you think the results of your analysis will be most sensitive to? In other words, which variables will have the most influence, if they differ from the baseline assumptions? Provide a general answer without extensive calculations and explain your reasoning. (2-3 sentences).
- Select two variables you think might be influential based on your reasoning in part b. Explore the influence of varying these to be higher and lower than your baseline value. Have your calculations confirmed the initial thoughts you had for part B? Did anything surprise you? (There are multiple acceptable answers).