

Cost Effectiveness Using a Decision Tree

Measles Example

Part 1. Fifteen new cases of measles reported in a small town. All of the cases are in children age 8 through 15 who previously received only one measles vaccination. The problem is deciding whether to recommend that all children who were vaccinated only once be revaccinated.

There are two cases in terms of the exposure to measles: The child may get exposed to an infectious case of measles or not. Upon exposure to an infectious case, children either contract (get) or do not contract measles. If they contract measles, the outcome of interest is death from measles.

- a. Determine the alternative courses of action in this problem. Identify the events that are in control of the decision maker (s) and the ones that are not.
- b. Draw the decision tree for this problem.

Part 2.

Experts estimate that 20 out of every 100 children (age 8 through 15) will come in contact with an infectious case of measles each year (i.e. will be exposed to an infectious case of measles). Literature review reveals that the probability of getting measles if exposed to an infectious case is 0.33 in a child who has had only one measles vaccination and 0.05 in a child who is revaccinated (Mast et al 1990). The probability of getting measles who are not exposed to measles is, of course, zero.

The probability of dying from measles if a child gets measles is 23 per 10,000 cases. Assume that the probability of dying from measles in children who don't get measles is zero.

- c. Update the decision tree with the probability estimates given above.
- d. What is the expected probability of death from measles
 - i. For the re-vaccination option
 - ii. For the no-revaccination option

Part 3.

Based on the estimate that it will cost \$9.44 to revaccinate each child, the cost to the county of a program revaccinating 100,000 children is \$944,000; the cost to the county of not revaccinating 100,000 children is \$0. Find the incremental C/E ratio of the re-vaccination program (option).