A manufacturer of CT equipment has announced the results of a randomized clinical trial that was designed to determine whether whole-body CT scanning at age 65 could increase life expectancy by identifying early cancers and other treatable conditions. One percent of the people in the study had a previously unrecognized treatable condition. The treatment was surgery, and one person died during surgery for every 1000 persons who had surgery, whether they had the treatable condition or not. Everyone with a positive CT scan had surgery, because false-positive scans could be distinguished from true-positive scans only during surgery. Whole body CT scanning found 95 percent of treatable conditions, but it also was positive in 20 per cent of people without a treatable condition. The results of this study showed that people who were screened on average lived longer (14.9444 years) than people who were not screened (14.9000 years). The authors concluded that everyone should have whole-body CT screening at age 65.

The researchers did not collect information on cost, so you decide to calculate what the costs would have been if they had been measured. Your consultants, who are experienced and reliable, estimate that the average costs were as follows. Whole body CT scanning cost $1000. The cost of treatment was $19,000, whether the person lived or died as a result of treatment. People who did not have a treatable condition had no other costs. People who had a treatable condition had an additional $10,000 in costs, whether they had surgery or not. Your consultants tell you that other costs are not relevant, because they were about equal in the screening and no-screening groups and would cancel each other if they were included in the calculations.

**Question 1.** Construct a decision tree that describes the consequences of the choice between doing nothing and implementing a one-time screening program at age 65 with costs as the outcomes. Include all the information that an analyst would need to systematically study the problem.

**Question 2.** Use your decision tree to calculate the expected costs with screening and the expected costs with no screening.

**Question 3.** Use the actual years of life from the study and the expected costs from your decision tree to calculate the incremental cost effectiveness ratio for screening.

**Question 4.** The answer to Question 3 provides new information that the authors did not have about the additional cost relative to the additional length of life with CT screening. Considering this new information, do you agree or disagree with the authors’ conclusion? Why? (You will receive the same number of points no matter how you answer this question, as long as you make what we think is an honest effort to answer it. The reason is that we want you to start thinking seriously about questions like this one, even though we have yet to give you the information you need to understand all the implications of questions like this one.)