Using the PS software to calculate power for two proportions

Initial e-mail

We are planning to test a device that we estimate will reduce central line infections.

We know the incidence is 10% (10 of 100 line insertions get infected). The device is a silver-coated patch that is applied with each line insertion.

How many line insertions would we need to consent to prove that the device reduces infections to

A) 5%

B) 7%

for a power of at least 80% and a significance level of0.05?

Can you calculate this based on the information above?

Is there a website or free software I can use in the future to calculate this myself or is it more complicated than that?

My response

It sounds like a pretty straight-forward calculation. Just to verify

-- You are going to randomly assign subjects to receive either the 'standard of care' or the new 'silver-coated patch'

-- You interest is in comparing the probability of infection on standard care (p0) with the coated patch (p1). In statistical terminology, the null hypothesis would be p0 = p1 and the alternative is that p0 != p1

You are welcome to download an install the following free software which will do all of these calculations for you:

http://biostat.mc.vanderbilt.edu/PowerSampleSize

After getting the software, you want the dichotomous tab with these options:

Output: sample size

Independent; Prospective; Two proportions; Uncorrected Chi-squared test

alpha = .05; power = 0.8; p0 = 0.1; p1 = 0.05 or 0.07 (for your two scenarios below); m = 1

For p1=0.05, I get 435 subjects in each group (870 total); for p1 = 0.07 I get 1356 in each group (2712 total).

You can also use the program to make graphs, like the one I have attached. Let me know if you have any questions.

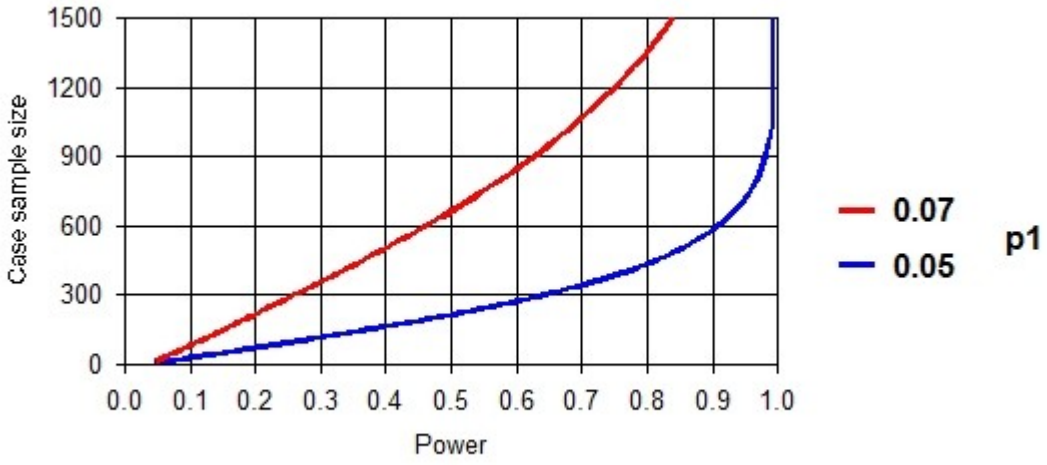

Illustration 1: Power curve created using p0 = 0.10 and the above parameters

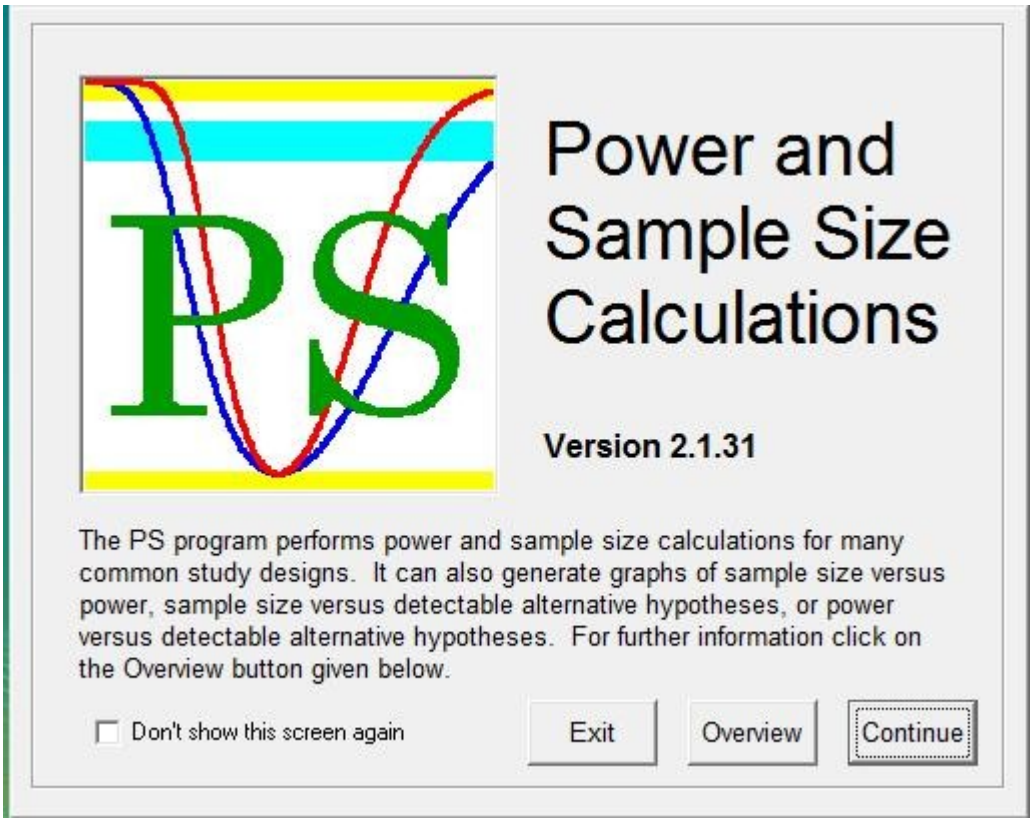

Illustration 2: Initial Welcome screen for the PS software package

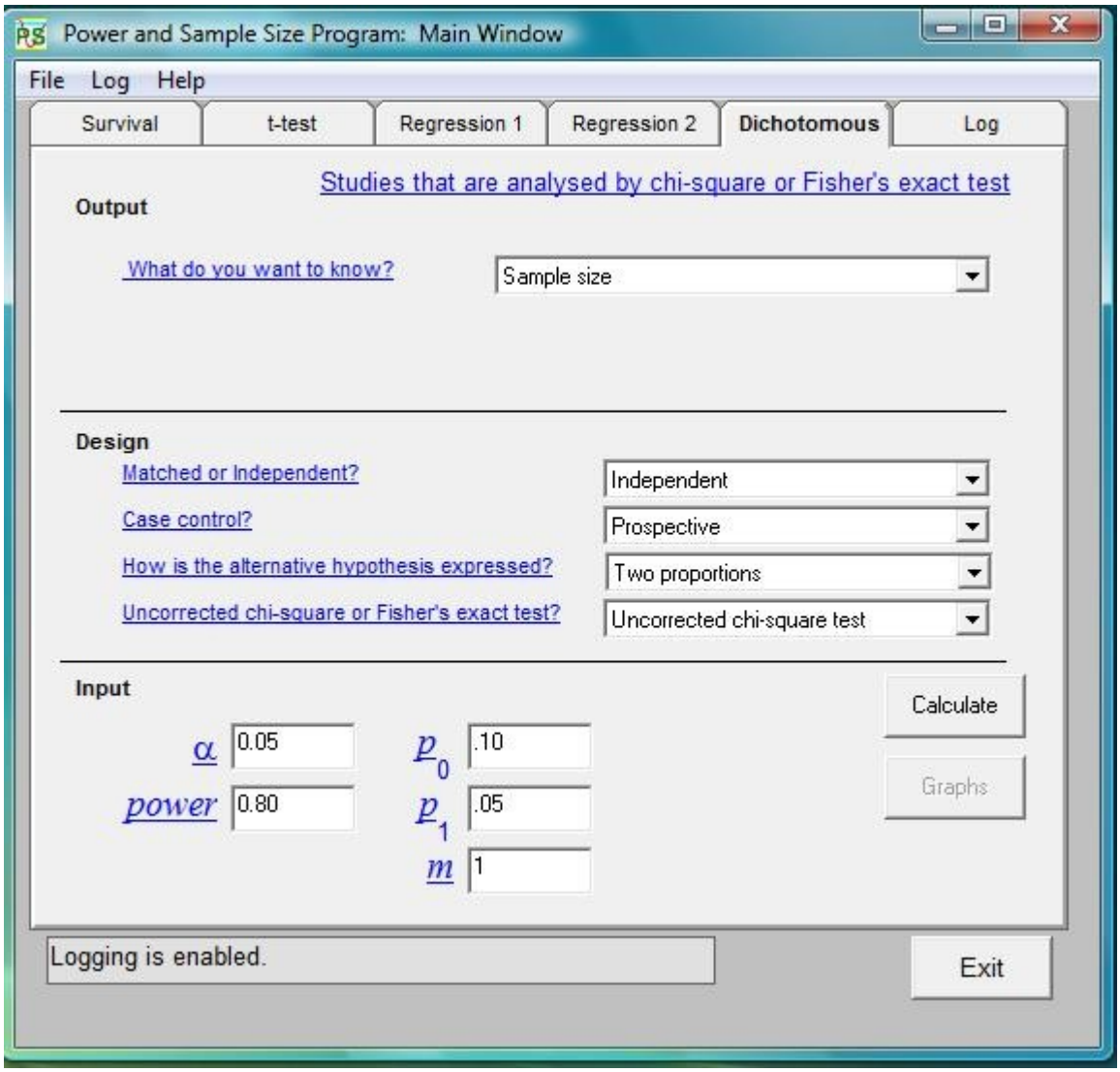

Illustration 3: Select the Dichotomous tab and input the parameters

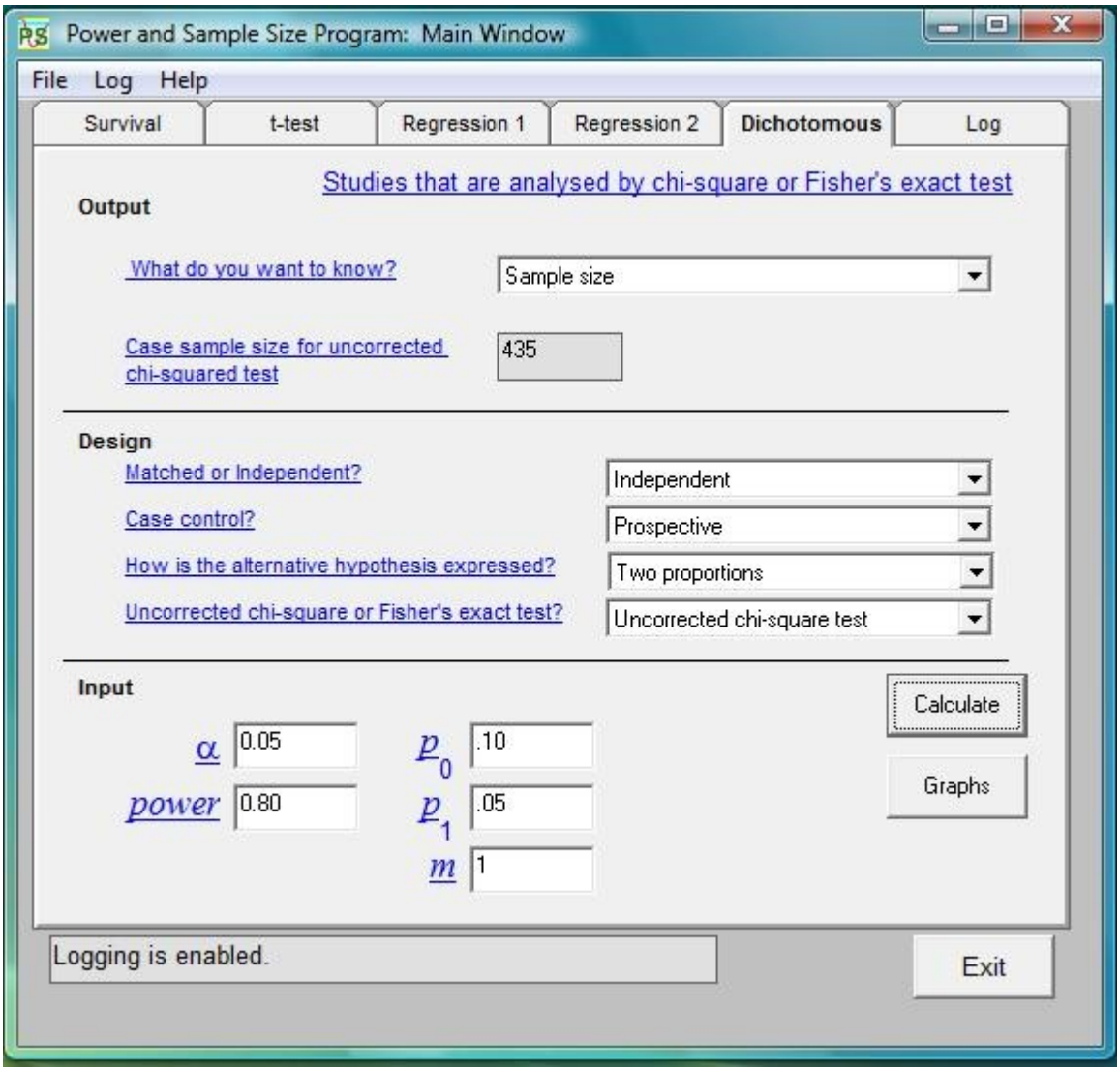

*Illustration 4: After clicking Calculate, the sample size will appear. Note that this is the sample size in the case (p1) group. With m = 1 (equal numbers of cases and controls), the total sample size is 2*435 = 870*

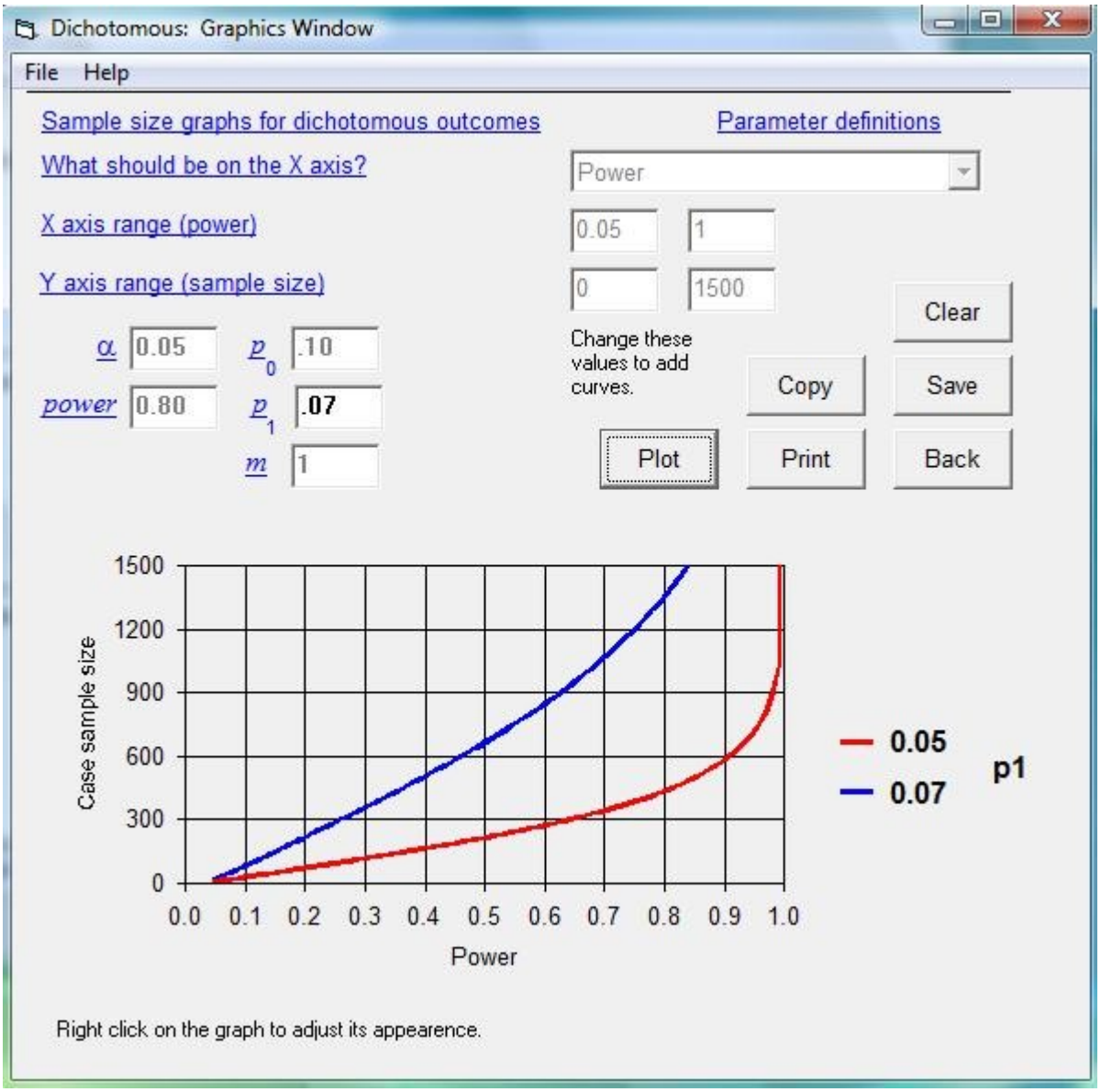

Illustration 5: By selecting the Graphs option (see previous figure), this dialog will appear. You can plot power versus sample size for different values of p1. Here p1 = 0.05 and 0.07.