Binomial Probabilities

Example Problem: If 10% of the population in a community have a certain disease, what is the probability that 4 people in a random sample of 5 people from this community has the disease?
Identify n = 5, p = .10, x = 4

1) To solve this problem perform the following menu selections:

IPSWUR-Probability
Discrete Distributions
Binomial distribution
Binomial probabilities …

2) Then enter your data. And click OK.

Output from R Commander gives the probability distribution (p.m.f.):

\[ P(X = 4) = 0.00045 \]
For Computing Tail Probability

Example:  What is the probability that 4 people or less in a random sample of 5 people from this community has the disease?
Identify n = 5, p = .10, x = 4

1)  To solve this problem perform the following menu selections:

**IPSUR-Probability**  
**Discrete Distributions**  
**Binomial distribution**  
**Binomial tail probabilities …**

2) Then enter the data in the dialog box for specifying the event, probability of success for each Bernoulli trial and choose whether and choose Lower tail since the probability of 4 or less is to be computed.  (If Upper tail is selected, the probability computed would be P(X > 4) = P(X ≥ 5).) Click OK.

Result:  

\[
> \text{pbinom(c(4), size=5, prob=0.1, lower.tail=TRUE)}
\]

[1] 0.99999  

(So, the probability P(X ≤ 4) = 0.99999)