In a time of extended drought, citizens in a small city in Southern California were required to restrict how often they ran water to their lawns. As a result, some of the trees in the city died to a lack of water. A concerned citizen decides to take a sample in order to measure the number of dying trees. He uses a city map that divides the residential homes into several thousand blocks. He randomly selects 75 blocks. For each of these 75 blocks, he counts the number of dead trees on each block. Here is a histogram of his data, along with summary statistics. Each bin on the histogram has a width of two. The first bin contains 0 and 1, the next contains 2 and 3, and so on.

n	75
mean	2.36
s	2.883
se	0.333
median	1
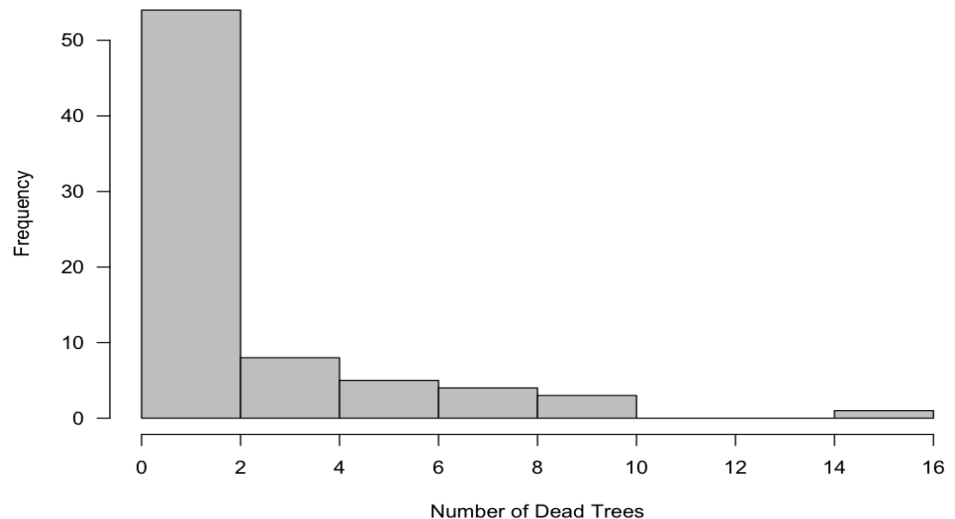
(a) Describe the distribution of the number of dead trees.

The distribution of the number of dead trees is skewed to the right and has a median of 1. Most of the blocks contain between zero and four dead trees and there is a possible outlier around 14 or 15.

(b) Interpret the sample standard deviation, *s,* in context.

The typical distance of the number of dead trees from the mean is 2.883.

(c) Name the sampling method used by this citizen to estimate the number of dead trees per each home. Describe why this method of randomly selecting blocks was a more practical choice compared to using a simple random sample of homes.

This is a cluster sample where the blocks are the clusters. This is more practical because once the researcher had driven to a selected block, he could survey many homes at once. If he took a SRS he would have to drive to very, very many different places.

(d) Estimate the probability that a randomly selected block in the city will have less than six dead trees.

$\frac{52+8+5}{75} = 0.867$

(e) We will assume that each block is independent of the next. Given that 19 of the city blocks had no dead trees, what is the estimated probability that if 4 city blocks were chosen these blocks would have at least one dead tree?

$1 - \left(\frac{19}{75}\right)^4 = 0.996$

(f) For further analysis, the concerned citizen is considering creating a 95% *t* confidence interval to estimate the average number of dead trees. Are the conditions satisfied for inference? Explain why or why not.

Yes. A random sample was taken from the population of interest, 75 < 10% of all trees, and 75 > 30, thus the sampling distribution of the sample mean is approximately normal.