(1) The sample median is an unbiased estimator of the population median when the population is normal. However, for a general population it is not true that the sample median is an unbiased estimator of the population median. The sample mean is a biased estimator of the population median when the population is not symmetric.

The sample 45th percentile is always less than or equal to the sample 50th percentile (otherwise known as the sample median). Hence the expected value of the sample 45th percentile is always less than or equal to the sample 50th percentile. This would make the sample 45th percentile a downwardly biased estimator of the population median.

The sample 55th percentile is always greater than or equal to the sample 50th percentile (otherwise known as the sample median). Hence the expected value of the sample 55th percentile is always greater than or equal to the sample 50th percentile. This would make the sample 55th percentile an upwardly biased estimator of the population median.

(2) The sample mean in general is NOT an unbiased estimator of the population median. It only will be unbiased if the population is symmetric. If the population is positively skewed then the sample mean will be an upwardly biased estimator of the population median. If the population is negatively skewed then the sample mean will be a downwardly biased estimator of the population median.

(3) If there is only sampling error, then the sample mean will never be a biased estimator of the population mean. The only way it could be is if there are non-sampling errors. Non-sampling errors can be caused by a low response rate, improper sampling, poor questionnaire design, selection biases, target population not equal to sampled population, etc.