Mean	The sum of all measures divided by the number of observations in the data set.	**Sample Mean**: $\bar{x} = \frac{\Sigma x}{n}$ **Population Mean**: $\mu = \frac{\Sigma x}{N}$ where Σx is sum of all data values N is number of data items in population n is number of data items in sample
Median	The middle value that separates the higher half from the lower half of the data set. Calculated Calculated by arranging the data in order from smallest to largest, then finding the midpoint. For data sets with an even number of observations, when there are two middle values, calculate the average between to the two middle values.	$\text{Median} = \frac{1}{2}(n+1)\text{th value}$
Mode	The most frequent value in a data set. Note: There can be more than one mode.	2 3 3 5 5 5 7 7 6 6 5 mode = 5
Range	The simplest form of measuring dispersion. Range is calculated as the difference between the largest and smallest values in a data set.	12, 25, 27, 29, 36, 38, 40, 43, 50, 54, 62 Range = 62 - 12 = 50 Range = Max - Min
Variance	The average of squared difference from the mean for a sample or population.	Sample Variance $S^2 = \frac{\Sigma(X-\bar{X})^2}{n-1}$ S^2 = the variance $\sum$ = the sum of X = the obtained score $\bar{X}$ = the mean score of the data n = the number of scores Thus, $\Sigma(X-\bar{X})^2$ = the sum of squared deviations Population Variance $\sigma^2 = \frac{\Sigma(X-\mu)^2}{N}$ σ^2 = the variance $\sum$ = the sum of X = the obtained score μ = the mean score of the data N = the number of scores Thus, $\Sigma(X-\bar{X})^2$ = the sum of squared deviations

Standard Deviation	Equals the square root of variance. If the standard deviation is low, data points are closely gathered around mean. If the standard deviation is high, data points are more spread out.	Sample Standard Deviation $S = \sqrt{\frac{\Sigma(X-\overline{X})^2}{n-1}}$ S = the variance $\sum$ = the sum of X = the obtained score $\overline{X}$ = the mean score of the data n = the number of scores Thus, $\Sigma(X-\overline{X})^2$ = the sum of squared deviations Population Standard Deviation $\sigma = \sqrt{\frac{\Sigma(X-\mu)^2}{N}}$ σ = the variance $\sum$ = the sum of X = the obtained score μ = the mean score of the data N = the number of scores Thus, $\Sigma(X-\overline{X})^2$ = the sum of squared deviations
DPMO	Average number of defects per unit observed during an average production run divided by the number of opportunities to make a defect on the product under study during that run normalized to one million.	$\text{DPMO} = \frac{\text{Defects}}{(\text{N*O})} * 1{,}000{,}000$ D = number of defects N = number of units (patients) O = number of opportunities per unit
Cp	Process capability. Measures the processes capability to fit within the customer's given specification limits (USL and LSL), that does not consider where the process is centered.	$(\text{USL} - \text{LSL})/6\sigma$
Cpu, Cpl	Process capability based on the upper and lower specification limit.	$\text{Cpu} = \frac{\text{USL}-\overline{\text{X}}}{3\sigma}$ $\text{Cpl} = \frac{\overline{\text{X}}-\text{LSL}}{3\sigma}$
Cpk	Process capability index. Measures the processes capability to fit within the customer's given specification limits (USL and LSL), with considering where the process is centered.	Minimum of Cpu, Cpl
Control limits	Upper and lower control limits are based on the normal variation in the process, set at 3 +/- standard deviations from the center line (or mean)	$UCL = \mu + 3\frac{\sigma}{\sqrt{n}}$ Upper control limit $CL = \mu$ Center line (median!) $LCL = \mu - 3\frac{\sigma}{\sqrt{n}}$ Lower control limit μ= process mean σ = process standard deviation n = sample size