

# Calculate the %CV

Coefficient of variation (CV) is a normalized measure of dispersion of a probable distribution. It is the ration of the SD to the mean

CV is a dimensionless number. So when comparing between data sets with different units or widely different means, one should use CVs for comparison instead of the SDs

Each lab defines their own CVs and try to improve/maintain

# Let us calculate CV of MCV

We need controls to establish CV  
(controls may be commercial or in-house)

Different level controls

Control sample of MCV is run 20 times

$$S.D. = \sqrt{\frac{\sum (X - \bar{X})^2}{N-1}}$$

$\sum$  = sum of  
 $X$  = any single observed value  
 $\bar{X}$  = average value  
 $N$  = total number of observed values

$$C.V. = \frac{S.D.}{\bar{X}} \times 100$$

**Mean (average value) = 2000/20 = 100**

**SD = Square root of mean of squares of deviation**

**CV = SD expressed as a percentage of mean**

Number	A ( $x_i$ )	$(x - \bar{x})$	$(x - \bar{x})^2$
1	95	-5	25
2	100	0	0
3	101	+1	1
4	102	+2	4
5	97	-3	9
6	103	+3	9
7	101	+1	1
8	99	-1	1
9	98	-2	4
10	100	0	0
11	95	-5	25
12	101	+1	1
13	105	+5	25
14	100	0	0
15	98	-2	4
16	101	+1	1
17	97	-3	9
18	106	+6	36
19	100	0	0
20	101	+1	2
<b><u>Average = 2000</u></b> <b><u>Mean = 2000/20 = 100</u></b>			<b><u>157</u></b>

List values in column A

1. Add column A, comes to 2000
2. Divide total of column A by no. of values (see mean formula), comes to \_\_\_\_\_.
3. This is the average or mean value
4. In column B list the difference in values of column A from the average values of column A from the average value 100, disregard + or – signs
5. Square each value and place in column C
6. Add values in column C
7. Divide the total of column C by number of values minus 1 (see SD formula)
8. Determine the square root of 8.37 which comes to 2.89. this is the standard deviation

$$S.D. = \sqrt{\frac{\sum (X - \bar{X})^2}{N-1}}$$

$\sum$  = sum of  
 $X$  = any single observed value  
 $\bar{X}$  = average value  
 $N$  = total number of observed values

$$C.V. = \frac{S.D.}{\bar{X}} \times 100$$

**Mean (average value) = 2000/20 = 100**

**SD = Square root of mean of squares of deviation**

**CV = SD expressed as a percentage of mean**

$$\text{S.D.} = \sqrt{\frac{\sum (x - \bar{x})^2}{n-1}}$$

$$\text{C.V.} = \frac{\text{S.D.}}{\bar{X}} \times 100$$

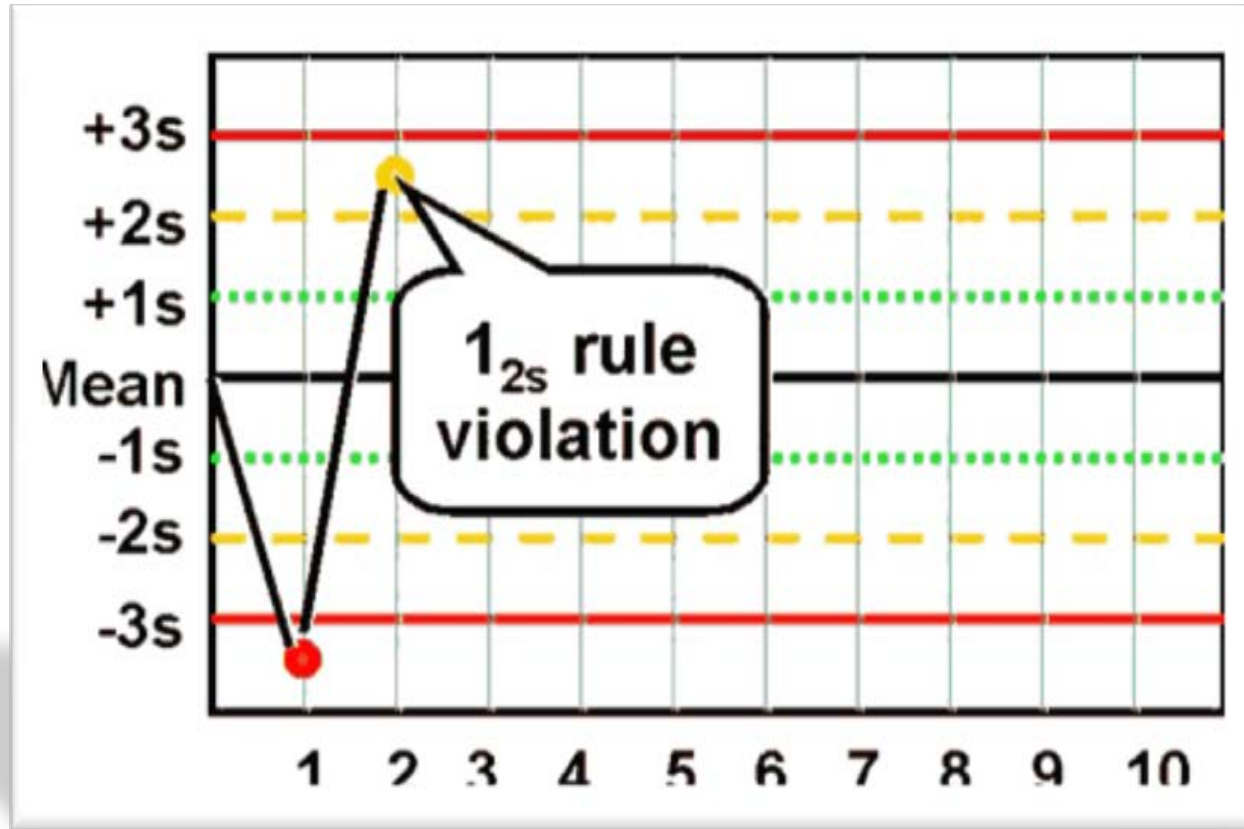
$$\begin{aligned} \text{Mean (average value)} &= 2000/20 \\ &= 100 \end{aligned}$$

$$\text{CV} = \sqrt{(157/19)}$$

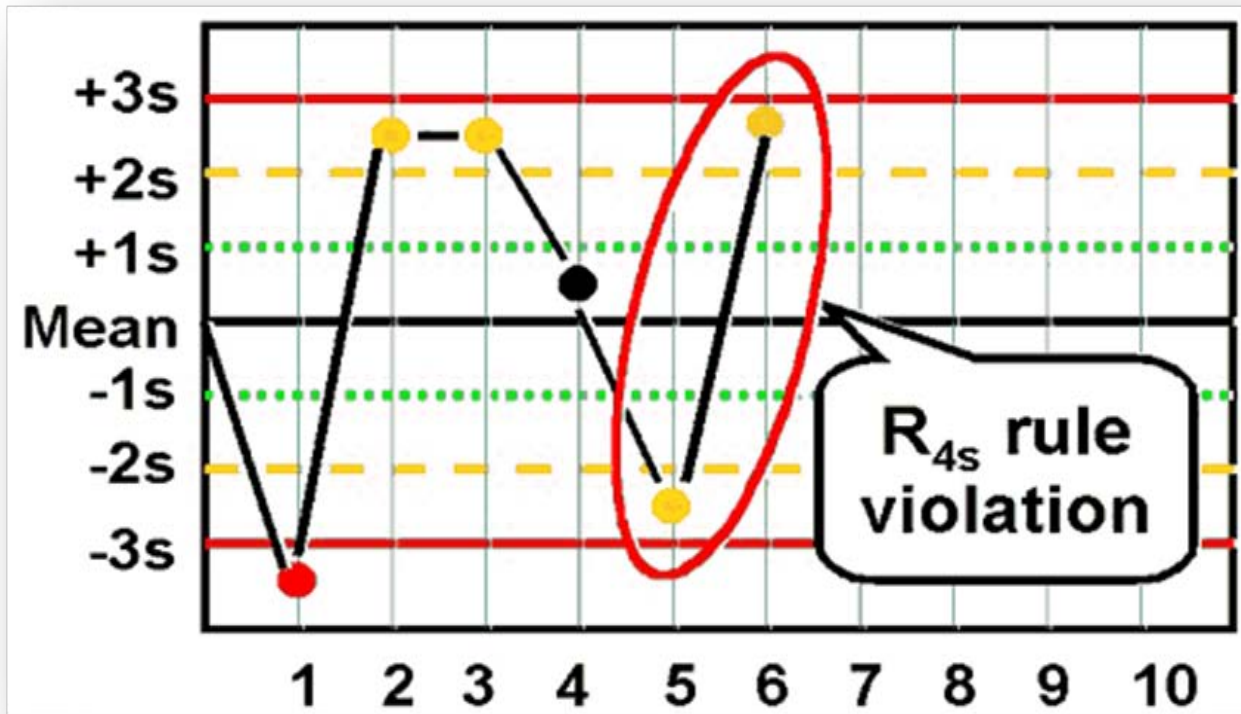
$$= \sqrt{8.36}$$

$$= 2.89$$

# Westgard rules







# Quality Indicator

Acknowledgements: Manik and team