

Shewhart Control Charts

G Chart: Formula



G Chart Formula

Data

Month	No. of admissions between infection (g)
Jan 17	15
Feb 17	10
Mar 17	12
Apr 17	7
May 17	9
Jun 17	15
Jul 17	4
Aug 17	11
Sep 17	14
Oct 17	5
Nov 17	8
Dec 17	12
Jan 18	8
Feb 18	9
Mar 18	17
Apr 18	8
May 18	10
Jun 18	6
Jul 18	15
Aug 18	12
Sep 18	6
Oct 18	7
Nov 18	20
Dec 18	13
Total (Σg)	253
k	24

Calculation

$$\begin{aligned} \Sigma g &= 253 & \text{gbar} &= \frac{\Sigma g}{k} \\ k &= 24 & \text{CL} &= 0.693 * \text{gbar} \end{aligned}$$

$$\frac{\Sigma c}{k} = \frac{253}{24} = 10.54167$$

$$\begin{aligned} \text{UCL} &= \text{gbar} + 3 * \sqrt{[\text{gbar} * (\text{gbar} + 1)]} \\ &= 10.54167 + 3 * \sqrt{[10.54167 * (10.54167 + 1)]} \\ &= 10.54167 + (3 * 11.030343) \\ &= 10.54167 + 33.091029 \\ &= 43.632699 = \mathbf{43.633} \text{ (to 3.d.p)} \end{aligned}$$

LCL = there is no lower control limit

$$\text{CL} = 10.54167 * 0.693 = \mathbf{7.305375} \text{ (7.305 to 3.d.p)}$$

Plot the infections, CL, UCL and LCL as seen on the chart

Legend + Chart

g = infections per sub group (per row)

Σg = sum of admissions between infections

k = number of sub groups

CL = centre line (0.693 * gbar)

UCL = upper control limit (gbar + 3 * $\sqrt{[\text{gbar} * (\text{gbar} + 1)]}$)

LCL = lower control limit

