

National Quality Improvement – Early Learning Project

Run Chart - Overview

Because they are simple to make and relatively straightforward to interpret, run charts are one of the most useful tools in quality improvement. They allow us to:

- Display data to make process performance visible
- Determine if a change resulted in improvement
- Assess whether improved performance has been sustained

How to use it

Run charts are line graphs where a measure is plotted over time, often with a median (the middle value of those plotted so that half are above and half are below) also shown. Changes made to a process are also often marked on the graph so that they can be connected with the impact on the process.

Identifying non-random variation

If we have at least 10-12 data points on our graph, run charts can also be used to distinguish between [random](#) and [non-random](#) variation using four simple rules.

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Run Chart: Four simple rules

Non-random variation can be recognised by looking for:

A **shift**: six or more consecutive data points either all above or below the median. Points on the median do not count towards or break a shift.

A **trend**: five or more consecutive data points that are either all increasing or decreasing in value. If two points are the same value ignore one when counting.

Too many or too few runs: a run is a consecutive series of data points above or below the median. As for shifts, do not count points on the median: a shift is a sort of run. If there are too many or too few runs (i.e. the median is crossed too many or too few times) that's a sign of non-random variation. You need to look up a statistical table (see Perla et al, 2011) to see what an appropriate number of runs to expect would be. An easy way to count the number of runs is to count the number of times the line connecting all the data points crosses the median and add one.

An **astronomical data point**: a data point that is clearly different from all others. This relies on judgement. Every data set has a highest and lowest. They won't necessarily be an astronomical data point. Different people looking at the same graph would be expected to recognise the same data point as astronomical (or not).

