

Run Chart

When we collect data about a work process, it is often helpful to illustrate the results in a graph. A run chart is one type of graph that is used to see if we perform our work in a consistent way or if there are obvious changes as the work progresses over the course of time. A run chart can be prepared for any characteristic of a work process that we want to measure and evaluate.

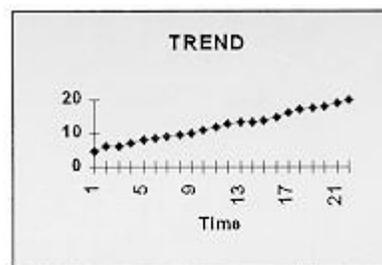
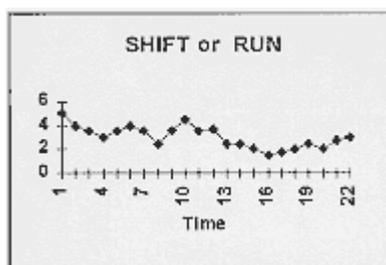
In a run chart, the data for a process measure are plotted either after several batches of work are done or as work is completed over a period of time. In an intermittent or batch process, data are usually obtained in a sequence. For a continuous process, data are usually obtained at set time intervals.

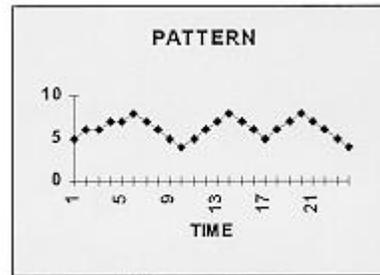
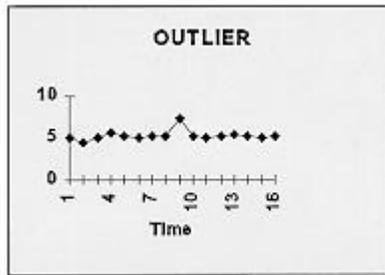
Run charts can be used to monitor characteristics or features in a number of work processes in a hospital. Process characteristics that are typically measured include dimensions of quantity, quality or time. When the data is plotted, the chart can be used to identify trends, shifts, pattern and outliers that may exist in our work.

How to Construct a Run Chart

1. Determine the problem or question to be studied.
Collect the appropriate type and adequate amount of data. (Note: Ask for assistance if you have questions about the sampling plan.)
2. Scale and label the horizontal, or x, axis to describe the process in the batch sequence or time period that was measured.
3. Scale and label the vertical, or y, axis for the characteristic, or variable that is to be plotted.
4. Plot each data value in the sequence or chronological order that it was obtained.
5. Label the graph including a description of the process and the sample size.

When interpreting a run chart, the following guidelines apply. A **trend** is a change in the process where values move in the same direction over time. A **shift or run** is a process change in which the average or center line shifts. A **pattern** is any non-random result such as a cycle that repeats over time. An **outlier** is a value that lies significantly outside the range of the rest of the data. These four cases are illustrated below.



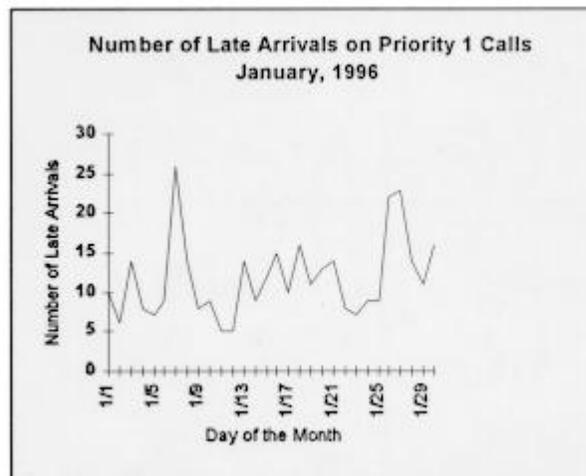


A run chart can raise question about the work process and its performance. For example, are the results what would be expected? Can the shifts, trends or outliers be explained? The data might also reveal another common problem. Often a process will be free of trends, shifts, patterns and outliers, but is still unable to meet specifications. The solution to this problem is to identify improvements that will adjust the process to target or reduce the variability.

Why Use Run Charts?

Run charts are used to determine if a process is performing as expected and whether there are changes in a process characteristic in a sequence or over time. Run charts are also used to identify early patterns and outliers among the observed data. This analysis can be useful for problem solving and for comparing to a process standard or requirement.

As an example, a run chart was prepared to monitor ambulance response reliability during the month of January. In the run chart below the process characteristic Number of Late Arrivals on Priority 1 Calls is plotted for the month of January. The chart illustrates that the number of late arrivals fluctuates considerably, particularly around January 6th and 26th when major snow storms occurred. Also during this period the lowest number of late responses was five on January 11th and 12th while the highest number of late responses was 26 on January 7th.



Source: <http://www.nhtsa.dot.gov/people/injury/ems/leaderguide/#qitat>