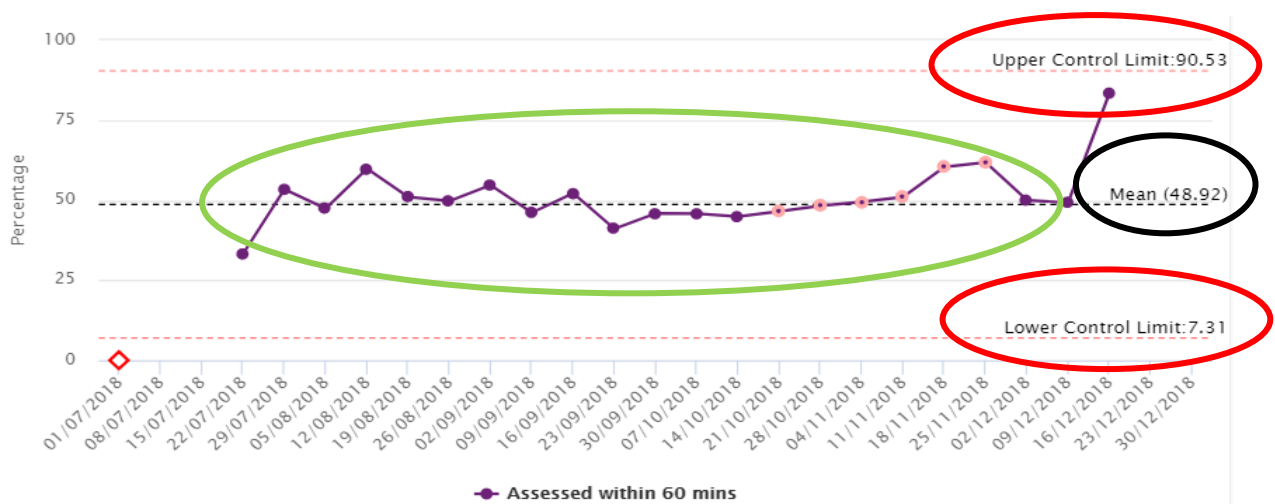


Understanding SPC charts

The charts in your new online dashboard can tell you a lot about how your ED is performing over time and compared to other EDs. If you're not used to seeing data in this way it can take a little time to get used to. This guide will help you understand the charts and interpret your own data.

The main type of chart is known as a **Statistical Process Control (SPC) chart** and plots your data like a run chart every week so you can see whether you are improving, if the situation is deteriorating, whether your system is likely to be capable to meet the standard, and also whether the process is reliable or variable.



Statistical process control (SPC) chart

SPC is an analytical technique – underpinned by science and statistics – that plots data over time. It helps us understand variation and in so doing guides us to take the most appropriate action. SPC is widely used in the NHS to understand whether change results in improvement and in industry for quality control.

As well as seeing your actual data plotted each week you will see a black dotted average line, this is the **mean** percentage of patients. The SPC chart will point out if your data has a run of points above (or below) the mean by changing the dots to white. If your data is consistently improving (or deteriorating) the dots will turn red so the trend is easy to spot. If a positive run or trend of data happens when you're trying a PDSA/change intervention this is a good sign that the intervention is working.

Mean

The mean value of each indicator is the average value calculated over all cases.

As well as the dotted mean line, you will see two other lines which are known as the **upper and lower control limits**. The control limits are automatically determined by how variable the data is. Around 99% of all the data will fall between the upper and lower control limits, so if a data point is outside these lines you should investigate why this has happened.

Control limits

The lower control limit and upper control limit are the two other lines above and below the mean. The control limits are automatically determined by how variable the data is.

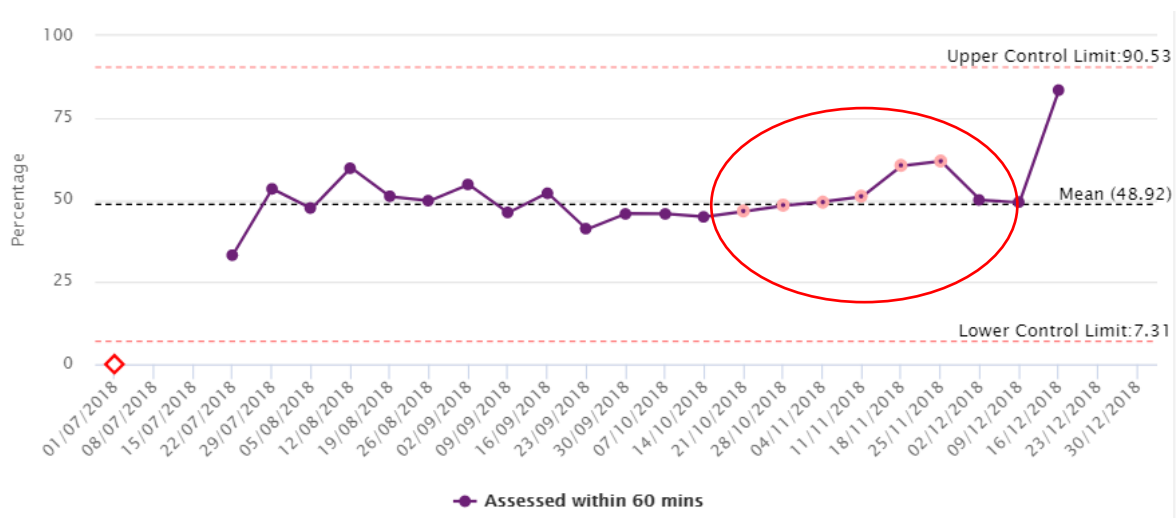
Around 99% of all the data will fall between the upper and lower control limits, so if a data point is outside these lines you should investigate why this has happened.

The next few pages help you understand how to interpret your data in the SPC charts. If you want to learn even more about how to use SPC charts, a really good guide is [Making data count](#) (NHS Improvement, 2018). You can find that guide and other great free resources on the [RCEM QI resources](#) webpage.

How the SPC charts can help you interpret your data

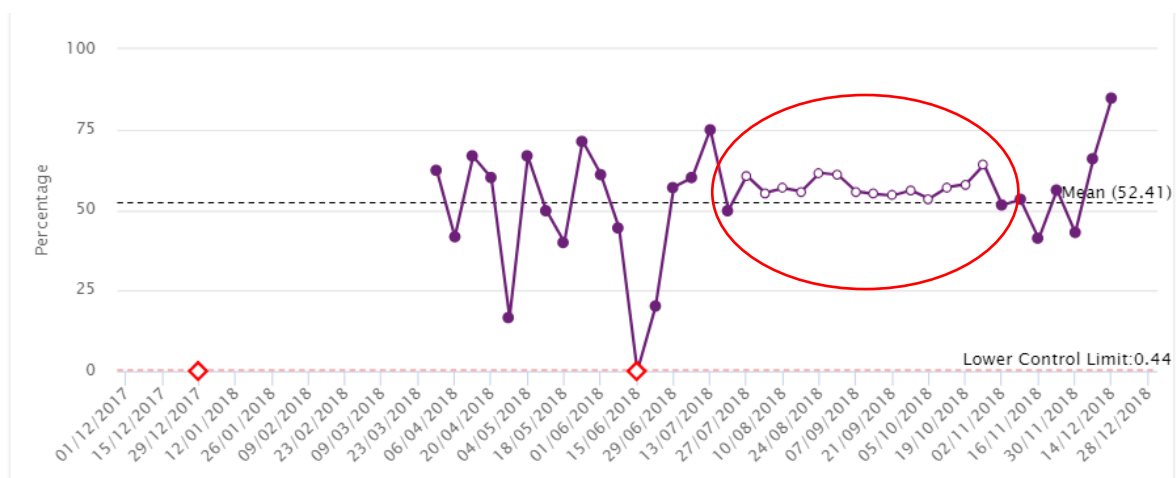
1. Performance is improving (or deteriorating)

A consistent run of data points going up or down will be highlighted with red dots so they are easy to spot. A run of data going up is a good sign that your service is making improvements that are really working. If the data is going down this may indicate that service is deteriorating for some reason – watch out for a lack of resources or deterioration as a result of a change somewhere else in the system.



2. Performance is consistently above (or below) the mean

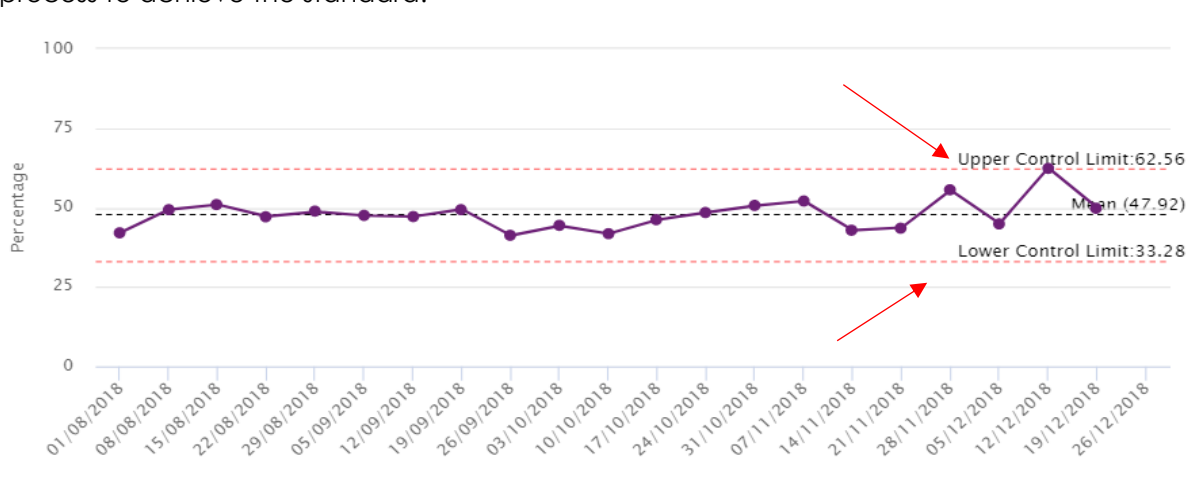
A consistent run of data that is above or below the mean will be highlighted with white dots so they are easy to spot. If your data has been quite variable this is a good sign that the process is becoming more reliable.



3. Is your system likely to be capable of meeting the standard?

The control limits show where you can assume 99% of your data will be. If you find that the standard is outside your control limits, it is very unlikely that your system is set up to allow you to meet the standard. If you do achieve the standard, this will be an unusual occurrence and very unlikely to be sustained. If this is the case, it is recommended that you look at how the process can be redesigned to allow you to meet the standard.

In the below example, the process is performing consistently at around 50%. The control limits show us that most of the time we would expect the process to be between 33% - 62%. If the standard for this process was 50%, then the process is well designed. If, however, the standard was 75% then the chart warns us that the system is not currently set up to allow the process to achieve the standard.



4. Something very unusual has happened!

The majority of your data should be inside the upper and lower control limits, these are automatically calculated by the system. If a single data point falls outside these limits then something very unusual has happened. This will be flagged up with a red diamond so you can spot it.

In some cases it may mean that the data has been entered incorrectly and should be checked for errors. It may also mean that something unexpected has had a huge impact on the service and should be investigated.

