Novel plots for the analysis of laboratory IQC data.

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Introduction

In order to satisfy ISO15189 standards, clinical laboratories are required to monitor their quality control performance. In addition to satisfying ISO15189 standards, this analysis should be carried out as a means of evaluating performance in the analysis of routine patient samples. Such analysis can be carried out on computers and many dedicated programs exist for this.

In the absence of such software, laboratory staff still require to perform the analysis. Furthermore, the automated collection, analysis and visualization of data by these dedicated programs may result in a loss of understanding of the detailed content of the data.

We present here, a straightforward approach to the analysis and visualization of laboratory data using the Microsoft Excel program.

Aim

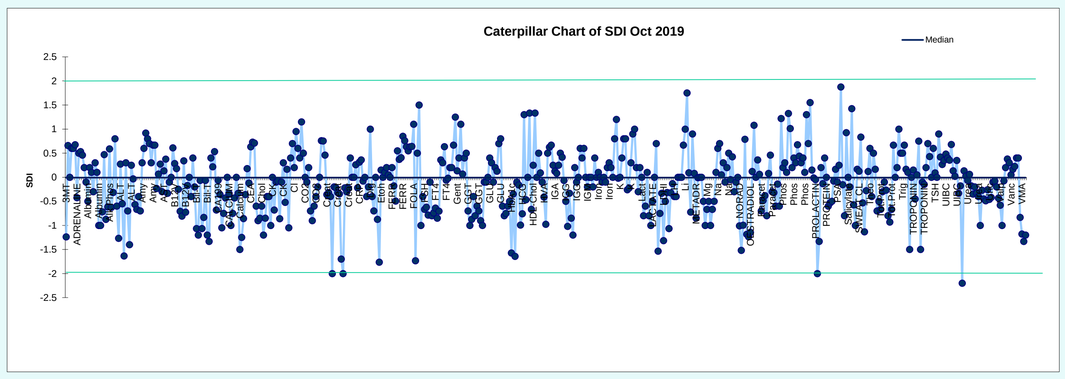
The aim of this work was to explore the use of established Quality Improvement run-chart software in a novel manner in order to visualise performance characteristics in a clinical biochemistry laboratory in a large district general hospital setting.

Method

Data was manually collected each month from our analysers and entered onto an Excel spreadsheet template.

We used run-chart methods from quality improvement science to analyse and visualize the data and we created two novel plots.

Results



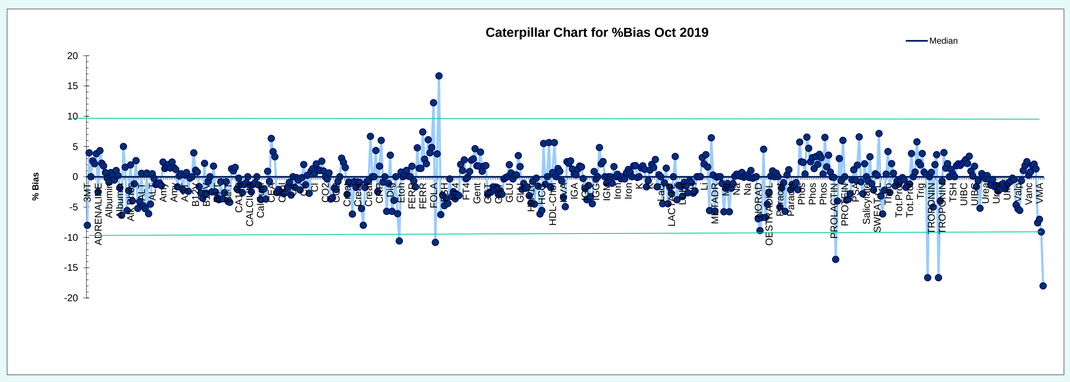


Fig 1 & 2, SDI and Bias plots. Each circle is a single analyte plotted on the horizontal axis whilst SD or bias is plotted on the vertical axis.

Results

In Figs 1&2, the two green lines represent performance limits. Data points outwith the limits would require to be investigated and the limits can be changed e.g. to make use of NQAAP performance targets.

Hovering the mouse over a circle enables the identity of the analyte to be displayed. In these examples, we have included all analytes on our analysers but improved visualization is obtained by trimming analytes e.g to show only immunoassays, only ISEs or only a particular analyser in a network.

Combining the SDI and bias plots enables a composite visualization (Fig 3).

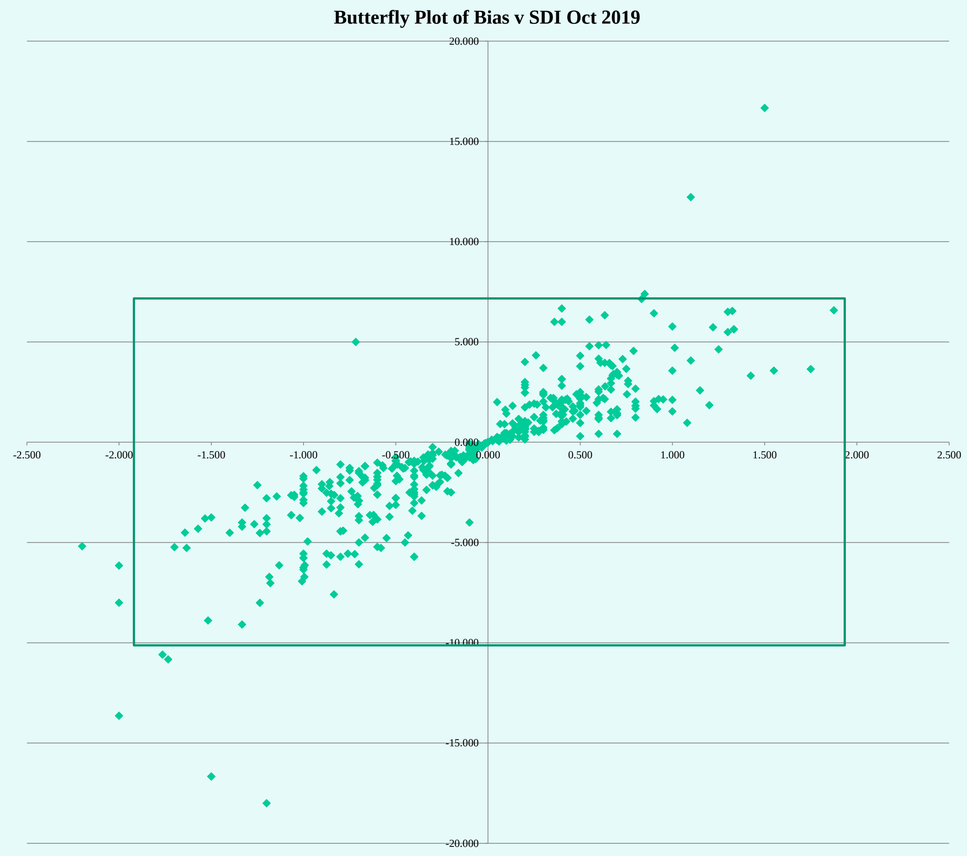


Fig 3 showing a plot of combined SDI & bias data. Each green dot is a single analyte. Ideally, all dots would be within the box. The dimensions of the box can be altered to appropriate targets for different analytes, eg. using NQAAP targets. Analytes outwith the box would require to be investigated .

Conclusion

We present here a novel approach to data visualization of routine laboratory performance data using Mircrosoft Excel.

This contributes to raising the profile and understanding of big data in laboratory medicine together with ways of using that data and of visualizing the story underlying the data.

Acknowledgements

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