The cost of rejected samples due to pre-analytical factors relating to Serum Indices

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Introduction

The majority of routine clinical chemistry assays are analytically very good and stable but this is of no relevance to a clinician or patient if there are errors pre-analytically or post-analytically.

Birmingham Quality has been running an EQA service for Serum Indices routinely since 2017. This probes the impact of Haemolysis (H), Icterus (I) and Lipaemia (L) on individual analytes, as well as assessing the quality of the HIL procedures.

Method

Three specimens from the same pools were distributed in 2017 (Distribution 105), 2018 (Distribution 115) and 2019 (Distribution 127). All were pooled human serum. Specimen A was positive for haemolysis (1.3 g/L), Specimen B was icteric (290 umol/L) and lipaemic (2.8 mmol/L) and Specimen C was lipaemic (2.7 mmol/L). Participants were asked to analyse HIL and sodium as Analyte X on all three specimens, and then return whether they would report the sodium result based on the HIL values.

Results

Analyte X was sodium in all three distributions. Table 1 summarises the ALTM (All Laboratory Trimmed Mean) Sodium results.

<table>
<thead>
<tr>
<th>Year</th>
<th>n</th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017</td>
<td>399</td>
<td>139.4</td>
<td>138.3</td>
<td>138.1</td>
</tr>
<tr>
<td>2018</td>
<td>467</td>
<td>138.9</td>
<td>137.5</td>
<td>139.5</td>
</tr>
<tr>
<td>2019</td>
<td>500</td>
<td>138.6</td>
<td>139.6</td>
<td>138.3</td>
</tr>
</tbody>
</table>

Table 1. Summary of the ALTM Sodium results in mmol/L for Specimens A, B and C in 2017, 2018 and 2019

It can be seen from review of data across the three years that there has been no significant change in the Sodium results or the interpretation of whether a result is reported.

Haemolysis Cut-Off Value Used

Participants are asked what HIL cut-off they use for ‘Analyte X’. Figure 2 shows the variation both within and between manufacturers for sodium. This shows there are very wide differences in practice in routine clinical chemistry laboratories.

Conclusion

A sodium assay is relatively cheap, but this is far outweighed by the costs to the patient having to have a repeat venesection: potential time off work, delay in diagnosis/management and costs to the health service: phlebotomy service, laboratory processing of sample and clinical time for reporting/interpretation of the result.

Addressing some of the pre-analytical issues within laboratories has the potential to save the health service a significant amount of money as well as reducing the impact on patients.