A Comparison of Manual and Automated Processing Methods for FFPE FISH Testing at CHL

R Day, E Parker, J M Cochrane-Williams
Cytogenetics, Canterbury Health Laboratories, Christchurch, New Zealand
rebecca.day@cdhb.health.nz

Introduction
CHL introduced HER2 testing using fluorescence in situ hybridisation (FISH) on formalin fixed paraffin embedded tissue (FFPE) slides in March 2013 and subsequently extended our malignancy FFPE service to include ALK.

Processing of FFPE slides requires a high manual input (2-4 hours of hands-on time per run) and increased slide numbers per run results in reduced consistency and an elevated repeat rate.

Therefore, due to an increasing test demand for malignancy FFPE FISH tests, we have trialled two semi-automated processors: the Leica Biosystem Thermobrite Elite and the Abbott VP2000. The trial compared the two processors to our manual method, assessing capability, quality performance indicators and test cost.

Cost Comparison
With current test volumes, in order to maintain clinically relevant turnaround times, a run of FFPE FISH slides is processed 2-3 times per week (6 slides per run). Table 1 compares the processing cost per slide of the manual process and the two processors.

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<thead>
<tr>
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<th>Manual</th>
<th>Leica Thermobrite Elite</th>
<th>Abbott VP2000</th>
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<tbody>
<tr>
<td>1 slide</td>
<td>$85</td>
<td>$75</td>
<td>$321</td>
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<tr>
<td>6 slides</td>
<td>$16</td>
<td>$22</td>
<td>$54</td>
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<tr>
<td>12 slides</td>
<td>$10</td>
<td>$18</td>
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<tr>
<td>24 slides</td>
<td>$10</td>
<td>$18</td>
<td>$13</td>
</tr>
<tr>
<td>48 slides</td>
<td>$10</td>
<td>$18</td>
<td>$7</td>
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Quality Comparison
Three slides cut from the same patient block were processed using CHLs current manual method, and the same method optimised for each of the processors. The probes used include Kreatech HER2 and Vysis ALK. Slides were blinded and independently assessed by two scientists (Figure 1).

Figure 1. Quality assessment based on probe signal, tissue morphology, background and overall ease of analysis. The three images are examples of the scoring system used.

*NOTE: Slides processed on the Abbott VP2000 and hybridised with the Vysis PathVysion HER2 Probe (Abbott), rather than probes routinely used in this laboratory, showed a significant improvement in quality. The basis for this difference is yet to be determined.

Conclusion
As expected, both processors use a higher reagent volume than our manual method; however both offer greatly workflow and significantly less manual input.

CHL aims to maintain <5 day turnaround times for FFPE testing. Therefore, in our opinion, the Leica BioSystems Thermobrite Elite meets our current and predicted future needs.

The more reasonable cost for lower volume runs is economical and efficient for our situation. Also, the consistent quality of the slide preparations is expected to lead to a reduction in repeat rate.