Use computer software associated with the LIMS and laboratory equipment – C2

Winpath software from CliniSys is the LIMS platform used throughout NUH blood sciences laboratories. The software is used throughout the laboratory processes: to book in requests, enter results, search for patient details or results, and also to manage the incomplete tests to keep the turnover running smoothly. Results are then validated and authorised for release and clinical staff then have access to the results, as the computer systems sends reports from Winpath to NOTIS. Certain comments or results have the option of being held back and only visible for laboratory staff, if they are not directly relevant to clinical staff. The automated instrumentation connects to Winpath via the Olympus Data Wizard (ODW) which manages the transfer of results to LIMS.

Figure 1 'Request entry' page on Winpath used for booking in a request for blood tests.

Booking in sample requests is done via the 'request entry' page on Winpath (figure 1). To manually request an entry, select the next free laboratory number and then search using the patient identifiers displayed on the request card. When the correct K number is highlighted, select enter to display the new entry form. The clinician, source, tests, sample time and date, sample type must be entered plus any additional comments stated on the request form (figure 2).

Figure 2 New entry form on Winpath, displaying fields for entering the patient and clinician details, test requests and details of the sample.

Olympus directory links all of the analysers with the ODW interface to manage the data information between the analysers and Winpath (figure 3). The ODW may pass results out automatically if the user has determined the results validated (QC and calibrations checks) and if the results are not abnormal. Alternatively, an assay may be programmed to hold all results back until authorisation. The ODW provides a list of all the samples that have been booked in for tests in our laboratory and so can be used to ensure all sample requests have been adhered to. The software also details the location of each sample, whether on the OLA, an analyser, archived position, or if the sample has not been seen. This facility proves useful when trying to locate a missing sample or a sample for further testing.
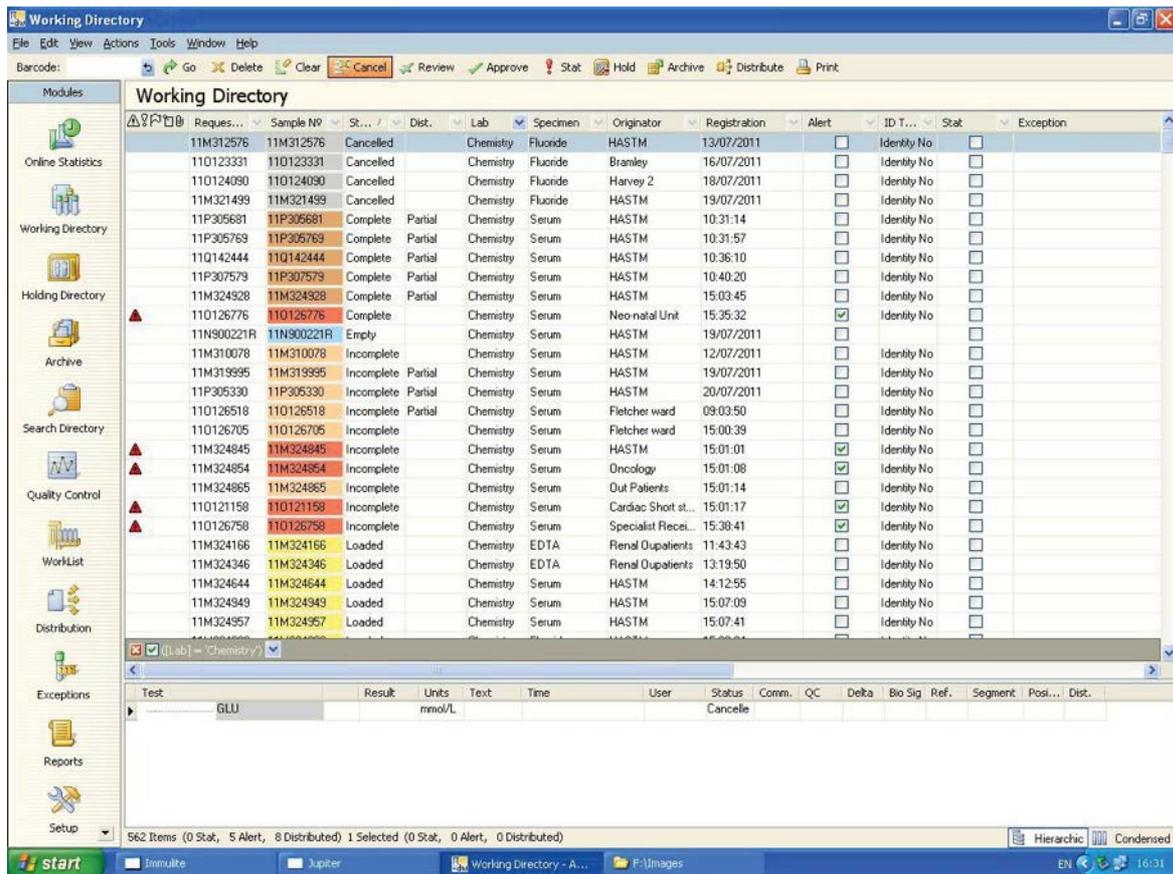
Figure 3: The screen of the ODW working directory showing a list of samples. The location, status, time, credentials are all listed.

The ODW is able to hold back results from moving to Winpath under certain conditions, for example, if a haemolysis index is raised. This allow a BMS to check the sample for evidence of haemolysis before validating or rejecting the results (e.g. in the case of potassium result rejection in a haemolysed sample). The ODW also provides coloured flags to notify the user of the status of each sample: red for sample flag, orange for incomplete result, yellow for loaded, green for approved, and brown for awaiting validation. This aids the BMS in prioritising work. There is also a column for time since the sample was received in the laboratory and this aids the monitoring of turnaround times. As all samples received from ICU have an expected turnaround time of 1 hour and inpatients a turnaround time of 4 hours, these times must be monitored and samples that are close to breeching times should be investigated.

Figure 4: Winpath worklists page. This section can be used to create new worklists, and manage current worklists through to authorisation.

The worklists function allows users to generate a worklist for a specific test when batch testing is performed. For example figure 4 shows a batch list for immunoglobulins, where capillary zone electrophoresis is used to detect presence of paraprotein. The worklist can be printed and used to enter results as shown.
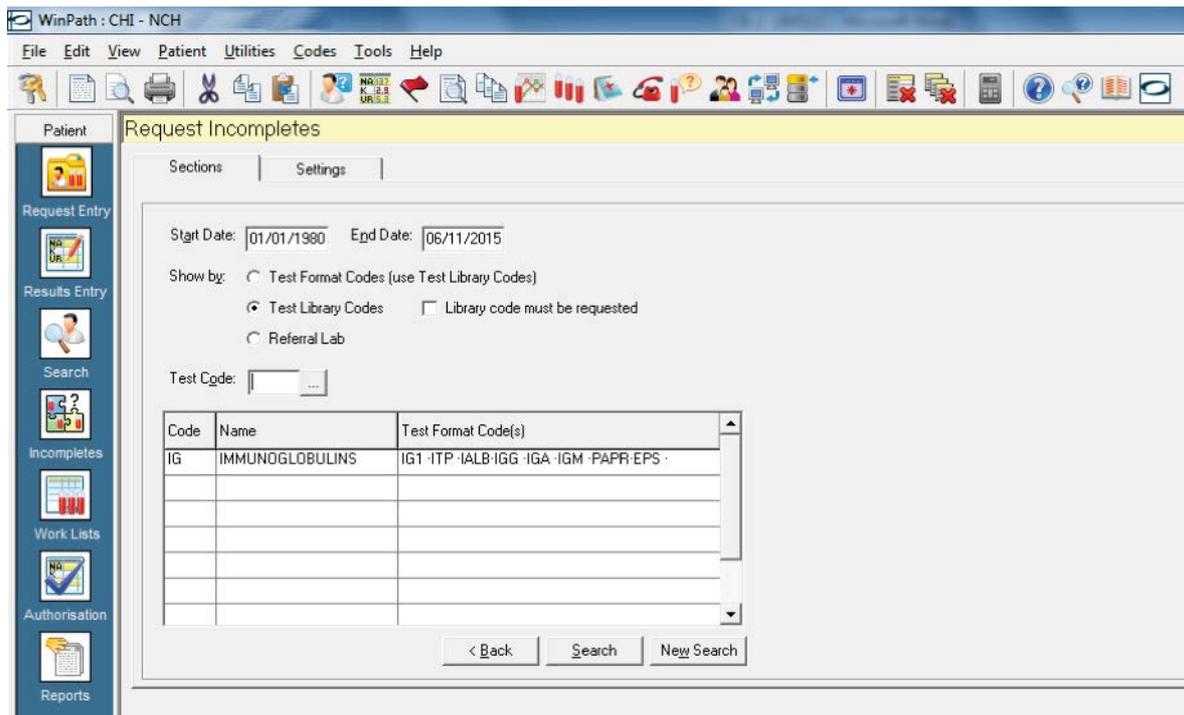
Figure 5: The incompletes page of Winpath. This allows generation of a list of incomplete results for a particular test code.

Similarly the incompletes function (figure 5) allows search of all the outstanding samples booked in for a specific test using the 'test library code' button. This check reduces the chance that a sample may be left without results being entered, and is particularly useful if a comment such as 'insufficient sample' has been taken off the worklist but not reported on Winpath.

Figure 6: The results entry screen on Winpath displays all the blood sciences results with the option of entering manually results or comments, for example, if a sample is haemolysed. Below – audit trail of users entering results onto Winpath.

The results entry section provides a platform to enter results from a patient specimen. The fields will be automatically filled with results from the automated core analysers from association with LIMS. However, for the lower throughput tests, results may need to be entered manually, for example, in protein electrophoresis. The page also allows comments to be added either through free-text or coded comments that have been written for routine use. For instance, the type of paraprotein identified (figure 6) or whether a sample is insufficient or haemolysed.

Age and sex related reference ranges have been programmed into Winpath, and are calculated depending on the demographics of the patient. This allows abnormal results to be highlighted in red (figure 6) for easy identification.

The results are then authorised in specific authorisation queues and appropriate comments added depending on the nature of the results, suggesting possible causes and additional tests required.