White Paper – Solving the Problem of Data Management

THE PROBLEM

The problem that is often facing small, medium or large lab testing facilities is that of antiquated software and inefficient data management. Recently a Sydney based Lab testing facility was juggling a manual data management system with both an increasing number of patients and an increased expectation of accuracy from the public as DNA knowledge was becoming increasingly mainstream. With the older system in place there are several potential catastrophes specific to the lab environment; the chance for lost, misplaced or wrongly filed information that could result in time and patience lost, lawsuits or due to the sensitive nature of their "product" it could even result in the wrongful accusations. Computer Frameworks was engaged to build a system that would improve the efficacy and accuracy of the data.

THE SOLUTION

The client wished to develop a Laboratory Management System to manage both patient records as well as to produce forms, work lists, and reports.

Computer Frameworks began work as they always do; with detailed interviews with relevant lab staff, in order to ensure needs were met. From there CF developed a detailed solution design including a data model, workflow definitions and user interfaces (illustrated by a basic non-functional HTML prototype). Similarly, solution design iterations were completed in continued consultation with relevant staff.

CF created the development environment and built the database. Computer Frameworks then migrated existing data into the new database. The next challenge was to develop sample management recording, tracking, linking, validating and archiving functionality. This would establish the exchange of relevant data between the lab and the billing system.

Finally the CF Team produced accompanying documentation, including a Training Manual and Systems Operation Manual. CF also provided additional IT support during User Acceptance Testing of the accounting system to the production environment.

THE BENEFITS

The primary benefit of the new system was that the client now had a fully automated data management system. They could trace reports, conduct sample management and do data searches with the click of a mouse.

Where reporting was concerned, the new system allowed data exchange to occur between accounting and patient demographics. The system also generates reports that reflect existing reporting data and formats. It allows interims as well as multiple reports to be generated that include a statement of days to report compared with industry standard.

The system even allows for standard report drop down options (e.g. No abnormality identified, Unsuitable specimen) and free text reporting of unlimited size, provides a "print hard copy" option (up to 6) as well as the option to allow reports to be easily converted to PDF files.

The software creates billing lists, billing charges to be updated as necessary (such as if extra tests are done or if tests fail) and generates statistical reports for the existing reporting data and formats by the following criteria; date, referring doctor, specimen type and it restricts

finalisation of billing reports until confirmation provided that all required tests on a particular sample have been completed.

Finally, it records report distributions including recipient, report format and date of send-in and permits report forms to be updated as required by scientific staff.

The new software tracks patients and specimens as well. It records the receipt of specimens at point of receipt, permits patients and specimens to be identified by both laboratory and billing systems, permits the patient and specimen data to be entered into and retrieved from both systems and allows for multiple tests to be ordered on a single sample at any time. The system even identifies and links new test to previous test results and flags the presence of this link. The system will even record up to four referring doctors in relation to any patient so there is no overlap. It also retrieves and inserts relevant patient details into new specimen records with minimum re-keying requirements.

The final task the system is capable of performing is that of; Data Searching, which permits multi-parameter user-defined searches based on a user-defined time period and one or more of the following fields: Result or Abnormality List, Age(s), Ref Dr/Centre, Postcode, Specimen type, Gestational age, Fee charges, Multi specimens (e.g. twins).

The system also has pathways in place in order to extend the use of the data management system to include: step-by-step dating and validation by scientist/technician for Uncultured and Cultured Samples as well as use of the Banding Method for specific samples. It would permit entry of additional information about Cultured Samples, such as free-form notes (e.g. about inappropriate samples, sub-culturing, harvesting) and other relevant data, such as contaminations, media required and sample retentions. It would also provide a system to track days in culture and days to harvest and allows completed reports to be scanned in and archived. It would even flag report deadlines during a culture period and maintain an archive record of the culturing process. This system also has the potential to track family members when tests are related between them, allow for ASCI file reports of referrals by specimen type for NSW Health Department and an automatic fax option for patients records.

Example: 1.1, 1.2 and 1.3 Diagnostic Database, Diagnostic Reporting