INTRODUCTION OF A LABORATORY INFORMATION MANAGEMENT SYSTEM

Some organizational aspects

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Introducing a Laboratory Information Management System will have a great effect on daily lab practice (1,2). Changes of procedures, tasks and way of working are inevitable. The organization of which the laboratory forms part of needs to adjust to the LIMS as the LIMS needs to adjust to the organization.

A proper description of all procedures and subjects describing daily lab practice has to be completed in a datamodel. Plans changing the organization are to be executed ending up in an appropriate working LIMS.

Tasks are not performed by a LIMS, just supported.

LIMS.

Data-acquisition is incorporated nowadays in most instruments. The collected data can be stored easily in a space-saving way, e.g. magnetic. Various more or less complex calculations can be performed on the captured data.

In the end a report concerning (part of) this data will be delivered to the applicant.

Data streams to be distinguished in the laboratory:

Sample log-in: Samples arrive in the lab with different data. Applicant data, charging data, sampling data and so on.

Sample preparation: The methods due to sample preparation.

Analysis: The methods used for carrying out analysis. Results in raw data.

Calibration: The methods used for calibrating analysis. Results in calibration data.

Data processing: Methods for data processing depending on the used methods for preparation and analysis. Parameters and raw data end up in results.

Reporting: Formatting (part of) the data to be delivered to the applicant. Or formatting the data for laboratory management.

The data are stored in a database build according the datamodel. Designing the datamodel data-driven and not process-driven results in a rather permanent datamodel. On top a software application to perform the tasks on the data for the lab personnel. This is called a LIMS.

The sooner the real users of a LIMS are involved in the process of designing the better the system will fit the standard procedure.

Effects of introducing a LIMS.

In the spheres of quality, personnel, organization and finance consequences are shown when a LIMS is introduced.

In Good Laboratory Practices calibration of the instruments used for the analysis is proved to claim the quality of the results. Using a database for storing data based on a proper datamodel for the laboratory, related data can be traced. To prevent errors copying data by lab personnel or redundancy of data should be avoided. The database reaches a tool for quality assurance.

Concerning the user interface the user has to have a finger in the pie. A user friendly LIMS improves the quality of work.

Each custom made report or immediate answer supported by a LIMS shows quality.

Involving the lab personnel in an early stage of introducing a LIMS let them grow into the changes caused. They can be trained during the process of introduction. This way of working will reduce rejection of the system because of the inevitable changes.

The organization of the lab has to be formalised in authorization of tasks. The different tasks have to be appointed. And the persons allowed to perform them. Unambiguous procedures ought to be defined, methods worked out, standards laid down.

When introducing a LIMS different costs will manifest. Hardware is needed. Software will include the database management system and the application. Maybe even additional software is required. The hard decision to buy commercially available software or to build a tailor made system or something in between depends on the matching of the datamodel. The completer and stable the datamodel, the better the match can be done. Don't forget the (re)training of the personnel. The implementation of the system will cost a lot of time. The investments in investigation will make good money because of reducing implementation time.

Conclusions:

The introduction of a Laboratory Information Management System will not influence only daily work in the laboratory. Quality and information supply will improve. Cost-benefit analysis is a hard one. A reduction of costs has to be calculated out of the mentioned improvement of quality, information supply and working environment and an optimal planning of the availability of the instruments and the personnel.

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