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Interaction between Clinical Departments and Express Laboratory in the Context of Information System of Multifield Hospital

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Abstract

Interaction between clinical departments and express laboratory of big multifield hospital is provided by integration of CIS and LIS. It comprises test order entering in clinical departments and their transfer to laboratory system, immediate acknowledgment of clinical departments of the status of running orders, sending of generated result reports to clinical departments, planning bio-substance collection. The systems integration resulted in saving the order running time, reducing redundant orders, improvement of informational provision of physicians and planning the work of laboratory.

Keywords:

laboratory information systems, clinical information systems, systems integration, medical order entry systems

Methods

Laboratory tests are among the most requested and informative diagnostic studies. The overall output of Central Clinical Hospital laboratories is 2 mln. tests of more then 400 parameters per year. About 25% of all tests are urgent. These studies are carried out by the express laboratory. Usually running of such a test takes not more then an hour. Mostly they are requested by intensive care departments (reanimation, post-surgery, cardio-reanimation etc). Capillary blood sampling is done by the laboratory personnel, other kinds of sampling and their dispatch is done by the personnel of clinical departments.

Until interaction between clinical departments and laboratory was automated there were certain problems of different kinds: order forms for express laboratory had been filled in manually, personnel of clinical departments and the laboratory had to dispatch and receive requests, and often redoubling of requests sent to express laboratory and other labs by different physicians had taken place.

Cooperation of clinical departments and the laboratory is provided by integration of Clinical information system (CIS) and Laboratory information system (LIS). CIS combines about 200 workplaces in clinical departments, and is designed for entering orders and receiving test results, and entering medicaments orders. LIS combines 40 workplaces and provides automatic fulfillment of all working cycles of the laboratory.

After integration of CIS and LIS entering of test orders is performed by physicians via their computers in clinical departments. During this procedure a doctor can look through the already planned patient orders, and ready test results. It will be of great help in making a reasonable decision to select this or that test, and to avoid redundancy. Immediately after entering into CIS the new order is transferred into LIS of express laboratory; and the laboratory personnel is informed by a special sound signal. A person in charge receives the orders, print them, and if necessary fulfill the bio-substance sample collection according to the state of urgency of the order. The system provides grouping of orders in dependence of their urgency, and develops a schedule of collecting bio-substance samples. Accuracy and validity of the running test is improved by the possibility for laboratory personnel to review previous tests results, clinical diagnosis, and other parameters of the patient. Test result is transferred to clinical departments electronically (preliminary result) right after the running is completed, and as a paper result report signed by a doctor of laboratory (final result). System also comprises electronic digital signing of the test result. Physician is informed by a special message on the screen of his computer when the result report is in CIS, and can review test results in the form of result report page, histogram or in dynamics.

Delphi and SQL Server were used for system implementation. Exchange of orders and test results is implemented in XML-format files.

Results and conclusions

As a result of CIS and LIS integration the automatic interaction of clinical departments and express laboratory in the process of order and test result transfer was provided. It helped to reduce the total time of fulfilling orders by 20% and eliminate redundant orders. Informational provision of physicians was improved. Man-hours for paper work, transfer or reception of orders and for bio-substance collection were substantially reduced.

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