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Case Study Clinical Analysis Department, L'Hospitalet-Cornellà

Organization of Hemacytometry area
With a capacity of 2,000 blood counts a day

Jordi Vila
Hematology section manager

«We chose Pentra DX analyzers for several reasons»

1. Robustness. Processing is rarely interrupted due to incidents.

2. Throughput. Up to 120 samples/hour per instrument.

3. Automatic module to process reticulocytes.

4. Automatic module for making and staining slides.

5. Correct imprecision, systematic error and total error values.

6. Easy handling of reagents.

7. Competent technical assistance.

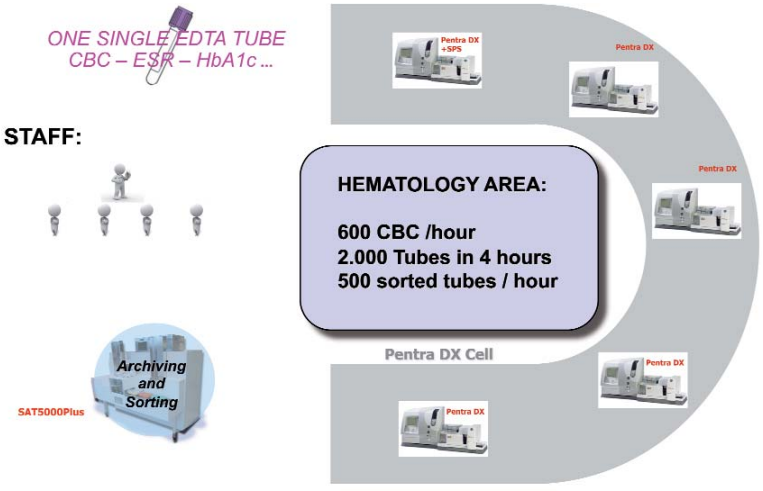
Organization :

The current **Laboratori Clínic de l'Hospitalet – Cornellà**, where I work, carries out a lot of medical work, and we are constantly having to adapt to the changing reality of clinical laboratories. We have been able to anticipate this change with an open mindset and by planning ahead.

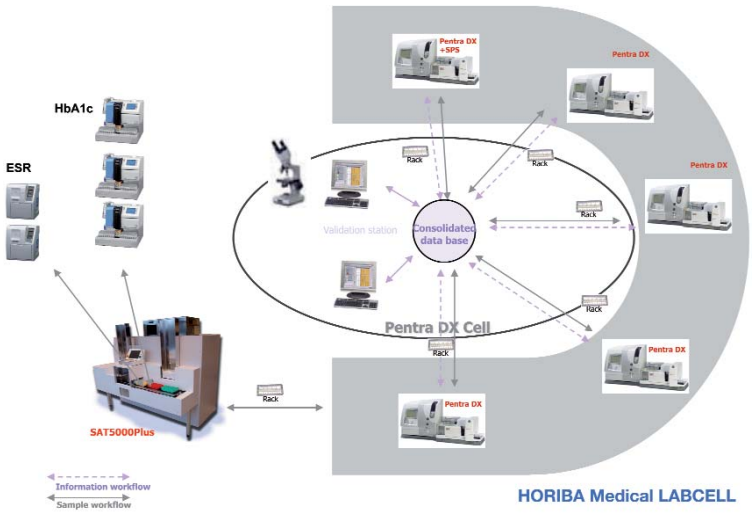
The last big step forward took place in 2006, and consisted of the merging of two clinical laboratories with over 1000 patients a day in order to cover a densely populated area of south Barcelona.

We began by defining our model, based on the idea of a general clinical laboratory. The model, or rather, the strategic plan, came before the organization chart and before the functional plan defining the organization chart. We discussed two major models: full automation with a long chain to which the analyzers are connected, or a "work island" structure, organized into fields of specialization, type of sample, and the values to be analyzed. During this period, prior taking our decision, we analyzed our activity taken into account statistics, staff, and the space required.

We opted for the "work island" structure. This allowed us to develop the hematology section independently of the rest of the laboratory.



LEAN WORKCELL



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We divided the section into two areas, the hemacytometry area and the coagulation area. After examining the activity in greater detail, we adjusted our workforce and technology accordingly.

. In terms of the activity itself, the average figures for 2008 were the following:

HEMACYTOMETRY AREA	COAGULATION AREA
- Complete blood counts (1,850/day)	- Coagulation (300/day)
- ESR (325/day)	- HbA1c (370/day)
- Reticulocytes (6/day)	- Groups and Coombs (50/day)
- Morphological studies (20/day)	- Spermiograms (35/day)

Heavy workloads can occasionally add over 20% to an average day.

. In terms of the workforce, we have appointed:

- A section manager
- A specialist and four technicians for hemacytometry
- A specialist and four technicians for coagulation

Both teams work afternoon and morning shifts, which overlap slightly.

. In terms of technology, we set ourselves three goals.

1. A single primary tube for all tests except coagulation.

2. Processing time for all 1,800-2,000 hemacytometry samples including technical validation to take place between 10.00 am and 2.00-2.30 pm on the same day. All other tests are completed around 7.00 pm.

3. Full automation of the entire process.

• Single EDTA tube for complete blood count, ESR, HbA1c, blood group, Coombs test (direct and indirect), reticulocytes, blood film, thalassemia tests, and other tests outsourced to external laboratories, CD4/CD8, HLA B27 and other HLA, genetic hemochromatosis studies, etc.

Working with a single EDTA tube has allowed us to reduce the number of incidents, has simplified extraction into the 70-odd peripheral centers, and has enabled us to cut the financial and environmental costs of using dedicated tubes for a single test.

• Having a sufficient number of analyzers to complete the day's activity.

The hemacytometry area was designed to allow all incoming EDTA tubes to be checked. The zone receives, classifies and stores EDTA tubes, most of which require blood counts.

Over 2,000 EDTA tubes arrive between 9.30 am and 12.00 pm. All are checked using technology supplied by HORIBA Medical hematology analyzers, the Pentra ML validation station and the SAT 5000 module.

The blood count uses five Pentra DX analyzers. Optimal processing speed is 120 samples per hour, and with five analyzers in optimal condition we are able to process 600 samples per hour. During normal working conditions, we can process 2000 samples in four hours. Between 10.00 am and 2.00 pm we can normally process all the day's blood counts.

The Pentra ML validation station offers many possibilities.

In our organization, Pentra ML allows us to handle around 40,000 numerical results per day, in addition to their technical and specialist validation according to validation criteria (expert validation rules). It also allows us to retain, according to established criteria, slides and reticulocytes. Our workload and the order entries do not currently justify a bidirectional connection to the LIS, although this is a real capability which allows to increase its performance features in terms of demographic information, delta checks, etc.

HORIBA Medical Spain's SAT 5000, manufactured by Mut (Germany)

This equipment enabled us to make significant improvements:

1. Working with a single EDTA tube, as the SAT 5000 automatically sorts the samples into different color supports for ESR, HbA1c, immunohematology, slide, reticulocytes, thalassemia, and external tests.
2. Refrigerated archive for the day's processed EDTA samples. Storage capacity of 5,120 tubes.
3. Classification and archiving speed is 500 samples per hour. This means that in laboratories with over 1,000 samples, all tubes are classified and archived in 2-3 hours.
4. Retrieval and tracing of tubes inside the robot is fast and easy.
5. The system is fully automatic.
6. The system has two major advantages: it is loaded using the same rack as the Pentra analyzers and the tubes are tidy stored in a refrigerated compartment out of sight.

In sum, the daily management of 2,000 EDTA tubes is always under control.

The strong points of our activity are:

1. Committed, diligent staff from 8.00 am to 8.00 pm.
2. A structure of "work island" which encourages independent decision- making
3. A single EDTA tube for all suitable magnitudes of section. Easy sample traceability.
4. Fully automatic technology supplied by HORIBA Medical. Pentra DX analyzers. Pentra ML validation station. SAT 5000 sorting and archiving robot
5. IT connection to the Laboratory Information Systems using HORIBA Medical technology, enabling access to the patient's results record
6. Electronic clinical history allowing access to details of patient's clinical history.

Working with this kind of organization in a specially designed area has allowed us to create a relaxed working atmosphere and to offer optimal assistential quality for diagnostics and the monitoring of quantitative and/or qualitative alterations in the blood count.

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