



1Point2

# Medical Test Laboratory — Dimensioning issues

SUCCESS STORY N° 14

## ⇒ ISSUES

- Sizing the various devices for analysis .
- Dimensioning of incubators number and size .
- Defining analysis protocols.
- Setting shifts and tasks for operators.

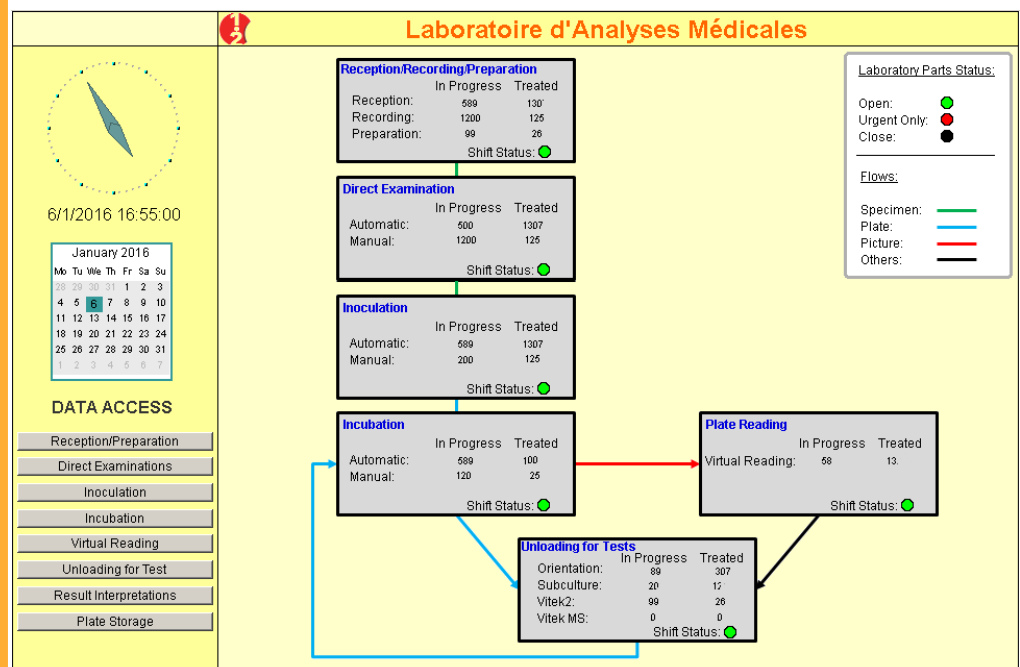
## ⇒ SOLUTIONS

A simulation model managing the different steps of a medical sample life since its arrival in the laboratory. The model takes into account equipments availability and capacity, as well as operators schedules and competences.

## ⇒ ADVANTAGES

- Reevaluation of the number of incubators required in the laboratory.
- Reorganization of operators shifts.
- Validation/optimization of analysis protocols.

In a medical laboratory, every day starts with the receipt of thousands of samples to analyze. Each sample must be prepared the same day before being subjected to an analysis protocol that may last several days. Delays are not tolerable in a laboratory. Therefore, being correctly dimensioned for the daily workload is a key issue.



The dynamic study was conducted in two phases.

The first step consisted in building a sizing model in order to test resources variations for the medical laboratory:

- Daily arrivals of thousands of medical samples.
- Preparation and incubation of samples.
- Management of analysis protocols: direct reading, pictures, additional tests, etc.
- Management of sample aging and setting of priorities to samples according to their protocol.
- Management of operators and competences.

Once the model was validated, the second step consisted in testing weekly loads of samples (with variations in volume for each time of the day) and integrating new analysis protocols.

Such a model requires an embedded database to take into account multiple parameters at any time: identification and full tracing of samples, information about operators, reagents and supplies, equipments, etc.

Thanks to the modularity of the model, the end-user had the opportunity to study new equipment installations (incubators, analysis and preparation devices), anticipating a workload increase in one laboratory or in several labs.

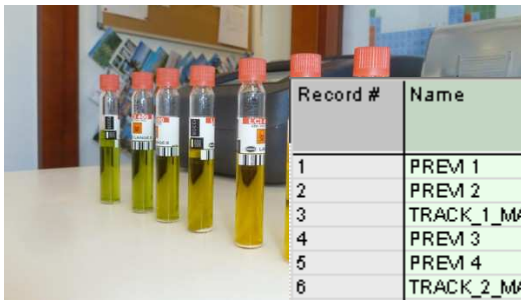
Simulation is one of the most powerful tools used to analyze complex systems. The advantages often go beyond the initial objectives. For example:

- ◆ **Understanding the system's dynamics:** how long (minimum/maximum time) does it take to prepare 50 samples? Where and when may long queues appear?
- ◆ **Anticipating** the operation of a new system or **improving** the functioning of existing systems. Simulation allows to avoid making small or big mistakes!

### Managing incoming samples

The model is able to manage a detailed schedule of incoming samples, but also to deal with random distributions in sample arrivals, thus reproducing the random variations observed in the real world. Each type or group of samples is defined by an occurrence probability for every hour and every day of the week.

The customer can reproduce, in quality and volumes, the weekly workload of a specific medical laboratory.



Record #	Name	Automatic	Maximum Rate	Batch Device	Operator Skill	Output Batch	Workbench
1	PREM 1	<input checked="" type="checkbox"/>	180,00	10	Inoculation1	30	none
2	PREM 2	<input checked="" type="checkbox"/>	180,00	10	Inoculation1	30	none
3	TRACK_1_MANUAL	<input type="checkbox"/>	180,00	0	Inoculation2	30	ManualInocPaillas
4	PREM 3	<input checked="" type="checkbox"/>	180,00	10	Inoculation1	30	none
5	PREM 4	<input checked="" type="checkbox"/>	180,00	10	Inoculation1	30	none
6	TRACK_2_MANUAL	<input type="checkbox"/>	180,00	0	Inoculation2	30	ManualInocPaillas
7	PREM 5	<input checked="" type="checkbox"/>	180,00	10	Inoculation1	30	none
8	TRACK_3_MANUAL	<input type="checkbox"/>	180,00	0	Inoculation2	30	ManualInocPaillas



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