First glimpse after 10 months of BD-Kiestra Total Laboratory Automation system implementation in a Belgian laboratory network

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Background:

Rationalisation of health costs implies the shift towards large centralised laboratory platforms to cater for the analytical needs of distant hospital laboratories, which therefore deal only with emergency analysis. Meanwhile good clinical practice implies maintaining a multi-disciplinary approach in infectious diseases involving microbiologists (M), infectious diseases specialists (IDS) and infection control specialists (ICS). Moreover it is necessary to shorten the Turn Around Time (TAT) in order to optimise treatment and try reduce hospital stay duration.

In this context, BD-Kiestra Total Laboratory Automation (BD-K-TLA) platform seems to be a promising solution.

Herein, we describe the first analytical and organisational benefits observed following the implementation in January 2016 of the BD-K-TLA in a clinical microbiology laboratory providing analytical support for four university hospitals located in Brussels, Belgium.

Material and methods:

Several parameters were evaluated for two similar periods before (March 2015) and after implementation of the BD-K-TLA (October 2016) to assess the added-value of the automated system in comparison with conventional methods (CM) previously used in our laboratories, namely:

- The Global positivity rate,
- The Time to Identification (TTI) and the consequences of the shift in laboratory organization including the adoption of a 24-hour operating schedule,
- Available management data before and after implementation of BD-K-TLA.
- The added-value of implantation of a system of long distance validation of results on a satellite lab.
- The practical consequences for the decentralized laboratories and the clinical practice.

Results:

Global positivity rate:

- 27.073 specimens were analysed in March 2015 and 25,851 in October 2016 with a global positivity rate of 21,1 and19,8% respectively.
- In October 2016 we processed 15,744 specimens on BD-K-TLA (60,9% of the activity), including all urine and maternal milk samples as well as MRSA screening, Streptococcus B, throat, wound and gynaecological swabs. The positivity rate was compared for the same specimens for both periods and was relatively similar.

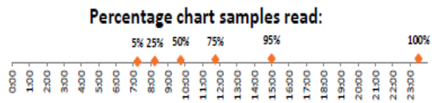
	Mar-15 (CM)	Oct-16 (TLA)
Number of samples	16.416	15.744
Positive samples	4.015	3.601
%	24,5	22,9

Time to identification (TTI) and shift of the lab organization to a 24h a day service:

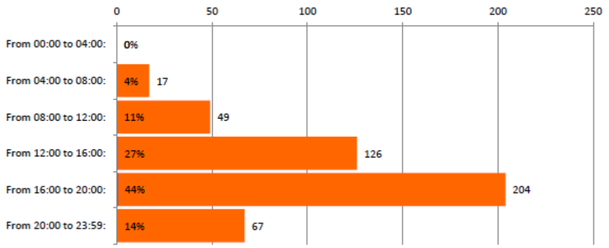
- TTI, defined as the time between inoculation and first reading, was evaluated on 6,249 urine samples in October 2015.
- The TTI were 23h43 and 25h07 for negative and positive samples respectively.
- As compared with CM, TTI did not decrease with automation and 24h service. Indeed, even if we inoculate samples on a 24h basis, the pictures of the plates are not read at the exact time they are captured especially during the night.
- Further decrease of TTI can be achieved with modification of the work organisation, such that pictures of cultures are read more frequently.

Management data:

- Compared with CM, BD-K-TLA provides useful lean-management data.
  - ✓ *Inoculation data*



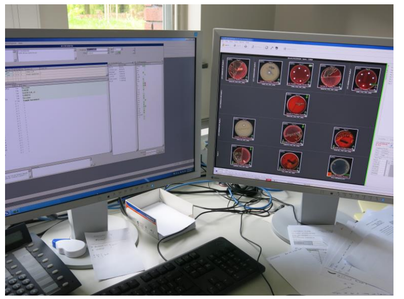
  - ✓ *Reading data:*



Long distance validation of results in a satellite lab:

The microbiologist in charge of the satellite lab has the same information as in the central lab. Indeed, the equipment includes the same BD-Kiestra® reading station as in the main lab, a connection to the Vitek® and access to the results of the Maldi-Tof.

We had no problem to organise a decentralised validation which is even more efficient since the microbiologist can check each plate and eventually requests additional tests.



Impact on the clinical practice:

These tools and the presence of a microbiologist on the distant site allow us to maintain a multi-disciplinary activity between microbiologists, infectious diseases and infection control specialists.

Conclusions:

- BD-K-TLA provides us with equivalent quality in patient care despite delocalisation of physical analysis of samples.
- Due to our own workload organisation, TTI currently is not reduced.
- BD-K-TLA provides better quality by providing full traceability and ensuring strict incubation times.
- The different production data were of upmost importance for the lab organisation.
- Such networking requires a team prepared for extensive reorganisation of the workflow. Efficient communication between teams, qualified technologists and a reliable IT department are also mandatory to manage potential connectivity dysfunctions.