# DATA INTEGRATION: A RELEVANT FACTOR TO INCREASE SAFETY AND EFFECTIVENESS IN A LABORATORY INDICATORS BENCHMARKING PROGRAM

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## Background

The first laboratory indicators benchmarking initiative in Brazil began in 2006 and was coordinated by the Brazilian Society of Clinical Pathology/Laboratory Medicine (SBPC/ML) and ControlLab. Currently, the Laboratory Indicators Benchmarking Program (in Portuguese: "Programa de Benchmarking de Indicadores Laboratoriais", PBIL) has approximately 280 registered laboratories, in more than 10 countries. The active participation of laboratories enrolled in the program remained stable between 2012 and 2020 at approximately 60%. Based on feedback obtained from participating laboratories and in line with reports in the scientific literature, the slow growth in the number of laboratories enrolled and the level of active participation in the program was primarily attributed to the difficulty in collecting data for indicators. As a response to this challenge, PBIL has intensified its efforts with the aim of supporting laboratories in automating data collection for indicators. Despite widespread understanding of the importance of performance indicators, their use in clinical laboratories is not at the same level. This "paradox" has been reported in the scientific literature and contrasts with the growing interest in the topic, in an effort led by national and international scientific societies and laboratory professionals, in view of the small number of laboratories that regularly collect data and monitor indicators, especially when they go beyond the scope of the analytical phase of the laboratory process cycle. The potential causes of low adherence to monitoring indicators and participation in benchmarking programs by laboratories have been reported and discussed. Among these possible causes, problems in data collection for the indicators were highlighted.

## Aim

The process of data integration between laboratory information systems (LIS) and the PBIL management platform, evaluating the actual stage of this initiative, and discussing the main limitations and benefits to enable the integration and automation of data collection in laboratories are described in this paper.

## Methods

The integration of laboratory data with PBIL is structured through a web service between the LIS system and PBIL platform. The technical specifications to enable data communication are standardized in an "Integration Manual," made available by ControlLab, the company that operates and manages PBIL, to partner LIS providers.
ControlLab provides a test base for the LIS provider to carry out the necessary communication tests with the web service and verify compliance with pre-established technical requirements. Upon success in this step, the LIS provider is homologated and communicated as a "PBIL data Integration Partner" for the laboratories. The data integration process has been standardized with four sequential steps: (1) creation of access profiles for the integrating company in the integrator platform, (2) homology of communication, (3) Authentication in the PBIL platform system, (4) Development of Integration, and (5) validation of sent data.
Communication between the laboratory system and indicator integration system occurs through a Representational State Transfer (REST) service over a secure HTTPS channel.
The standardization of the automated data integration process from the laboratories to the indicator program was developed with a focus on obtaining a high level of information security and extensive privacy of customer data, complying with all legislation related to this topic in the countries where the program Act.

## Results

In 2022, the indicator program already has four integrator companies approved. Among these approved companies, there are currently 14 laboratories with active data integration with the indicator program (corresponding to 5.0% of the laboratories enrolled in the program).
Considering that the PBIL indicators are obtained from different data and calculation formulas and that in the current standardization of the program, there are 221 different data, 37% of which are enabled by automated data integration in the current stage of the integration process, contemplating 59% of the indicators of the current version of the indicator program.
Regarding the profile of the laboratories that currently have automated data integration for the indicator program, we can highlight that: 59% of these laboratories perform up to 125,000 exams per month; 71% are private laboratories; 97% have some quality certification or accreditation; and 33% only perform tests from outpatients.
In the workflow with integration (figure 1), we can identify a reduction in the number of activities carried out by the laboratory compared to the workflow without integration (figure 2), which contributes to the efficient use of resources and a reduction in the probability of errors in the performance data to be compared in the program.

This is particularly relevant for indicators with more frequently collected data, for example, in the case of indicators related to internal control of analytical quality. Data collected more frequently have a higher probability of error when collected manually and consume more laboratory resources.
At the current stage of the integration initiative, nearly 60% of the indicators in the current PBIL scope are amenable to automated data integration, and approximately 6% of laboratories enrolled in the program already experience the benefits of integration, including optimization of the use of resources and security in obtaining data. There is a need to accelerate the data integration process and expand the number of qualified integrator companies and laboratories with enabled data integration, which is essential for new laboratories to join the program and for participating laboratories to expand their portfolio of monitored indicators without affecting resource efficiency.

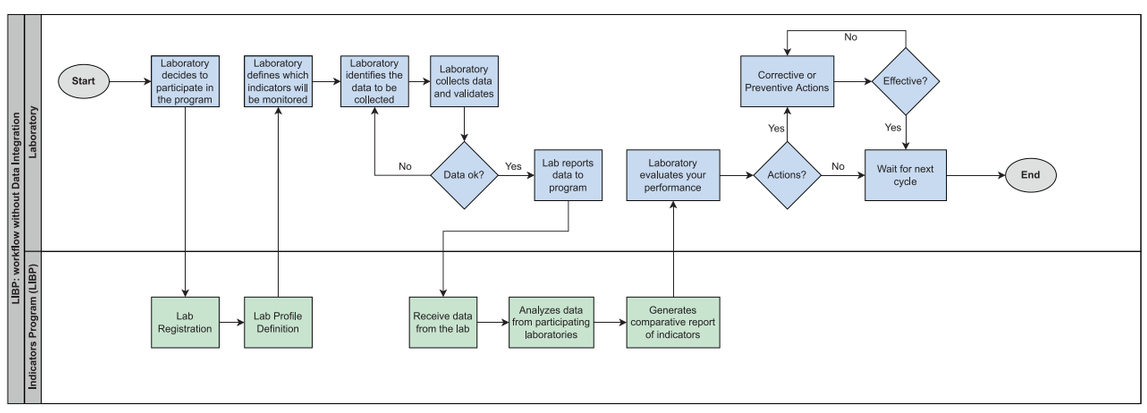

FIGURE 1 – PBIL process macroflow without automated data integration.

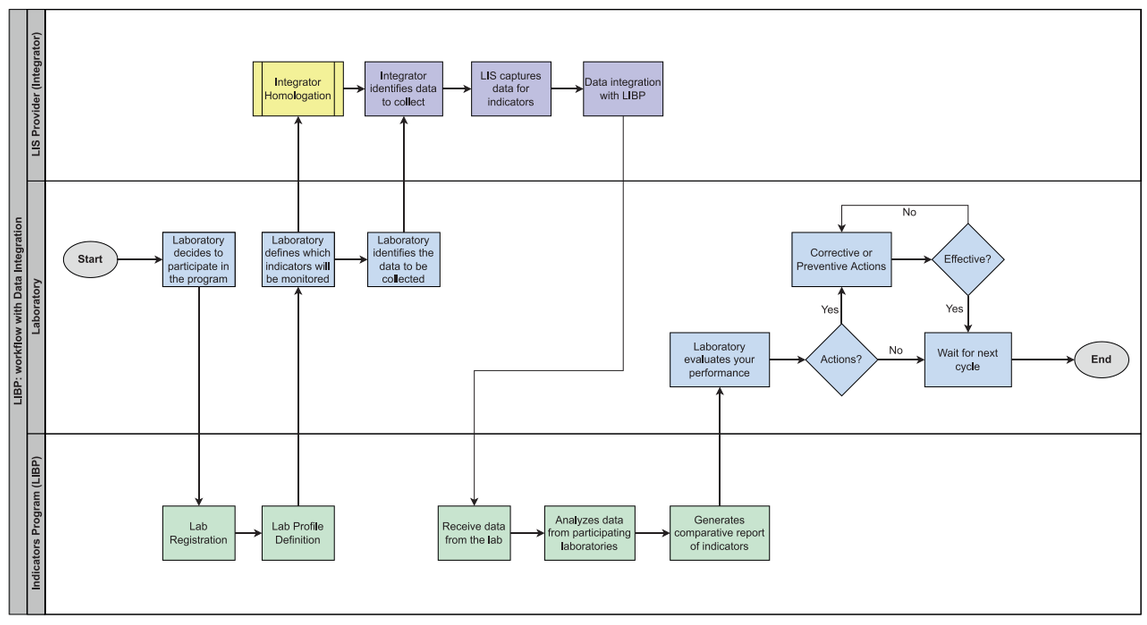

FIGURE 2 - Macroflow of the PBIL process with automated data integration.

## Conclusion

In the PBIL experience, the key benefits from data integration were related to improvements in data quality and security, such as lower risk of errors in manual data entry, reduction of risks in/from the manipulation of data by the user, and greater data robustness/reliability for comparing indicators; improvements in efficiency and resource usage, such as less time consumed in data collection and validation, less time to enter data collected in PBIL, less use of personnel in the stages of data collection, validation, and insertion; and, as additional earnings - It makes it possible to expand the number of indicators compared to the laboratory.
Data integration in PBIL already provides efficiency and safety improvements for laboratories that are already users of this feature, qualifying performance benchmarking among participating organizations. However, it is still necessary to expand efforts to increase the number of approved integrators and customers of these companies as users of this tool.

## Disclosure

The authors confirm that They don't have any conflict of interest to declare.

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