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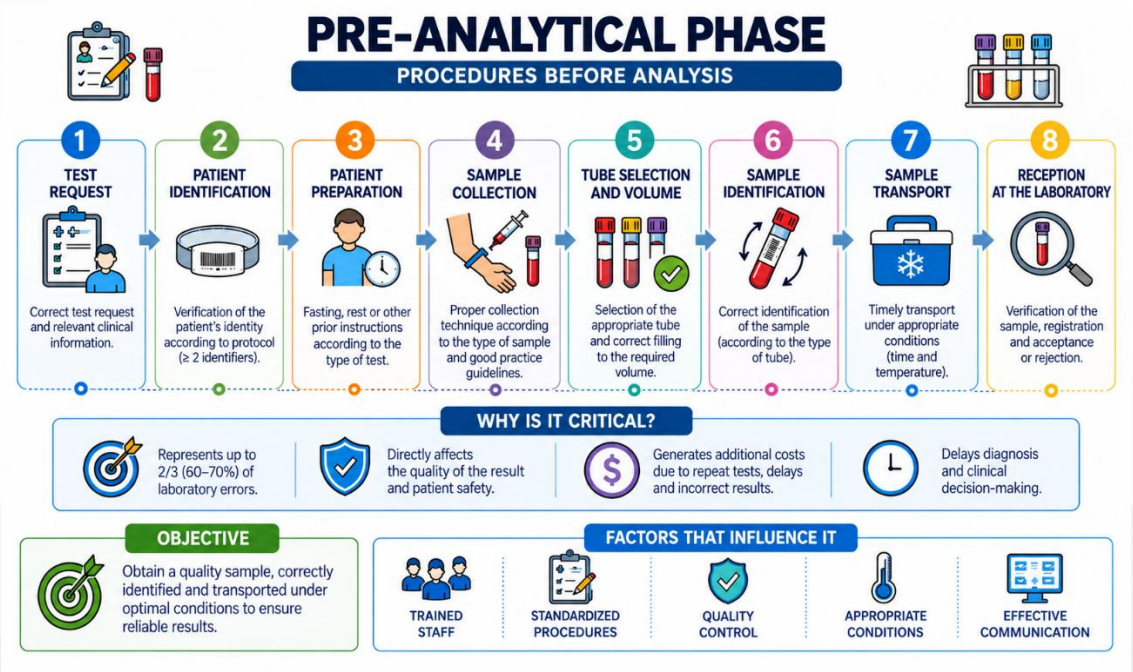
Butlletí Nº 160

The pre-analytical phase: understanding to improve

Pre-analytical errors account for up to 70% of all laboratory errors. This means that 2 out of every 3 errors occur during this stage. This is because the pre-analytical process is complex and involves many healthcare professionals, many of whom work outside the laboratory.

The objective of the pre-analytical phase is to obtain a sample of adequate quality to ensure reliable results. It is a critical stage of the entire process, as errors that occur during this phase can directly affect the quality of results and patient safety, generate additional costs due to repeat testing and delays, and hinder diagnosis and clinical decision-making.

The pre-analytical process begins with the request for tests by the healthcare professional and extends through to sample processing. It includes patient preparation, instructions for sample collection, blood collection and all the associated steps, transport to the laboratory, and sample reception. Errors can occur at any of these stages, ranging from incorrect patient identification to inadequate transport conditions.



So, do we really know how many people are involved in this process? To try to estimate this number, Catlab conducted a survey addressed to the nursing coordinators of the 39 primary care centres (CAPs) that send us samples. The survey was carried out between August and September 2026 using Google Forms and was distributed by email. The aim was to identify which professional profiles are involved and how many people participate in different stages of the pre-analytical process. To this end, respondents were asked who provides patients with instructions for sample collection, who distributes the necessary materials, how many nursing professionals perform blood draws, and who is responsible for preparing the cooler for sample transport. The results obtained were as follows:

Responses regarding who provides instructions for sample collection showed that several professional profiles are involved, including doctors, nurses, nursing assistants and administrative staff. Across the 39 CAPs surveyed, the professionals providing instructions included 119 nurses, 98 doctors, 29 nursing assistants and 132 administrative staff, giving a total of 378 professionals. In some CAPs, these roles could overlap; for example, instructions could be provided during a medical consultation or by administrative staff.

The distribution of the materials required for sample collection also involves different professional profiles. In this case, the figures were 69 nurses, 62 doctors, 35 nursing assistants and 161 administrative staff, giving a total of 327 professionals.

Regarding blood collection, 165 nursing professionals across the 39 CAPs surveyed were reported to perform this task on a typical day.

The preparation and assembly of the cooler for sample transport involves 32 nursing professionals and 38 nursing assistants.

As for sample transport and reception, the 39 CAPs are organised into 11 transport routes, involving 11 drivers. In addition, 5 laboratory technicians are involved in receiving the samples at the laboratory.

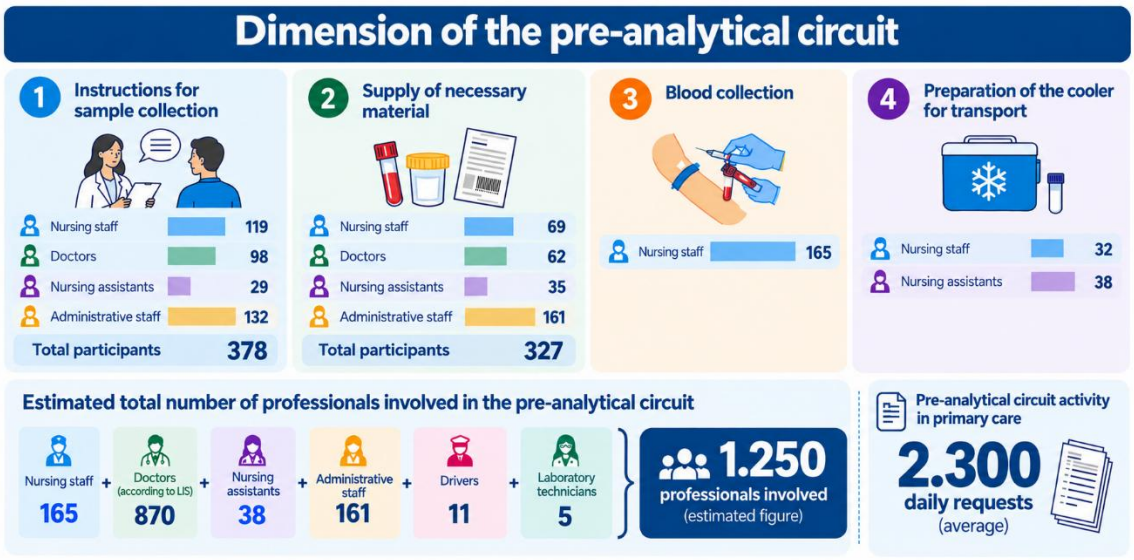
The results from the different questions cannot be added together directly, since the same person may participate in several stages of the process. For example, an administrative staff member may provide patients with instructions for sample collection and also distribute the necessary materials. Counting both activities separately would therefore mean counting the same person twice.

To obtain an overall estimate, we used the highest number recorded for each professional profile across the different activities, with the aim of avoiding duplication. Accordingly, we counted 165 nursing professionals, 38 nursing assistants and 161 administrative staff, to which we added the 870 doctors who request tests, according to the LIS data, the 11 drivers involved in the collection routes and the 5 laboratory technicians involved in sample reception. In total, the estimate is 1,250 professionals involved in the pre-analytical pathway.

Overall, the data collected suggest that 1,250 professionals are involved in the pre-analytical pathway in primary care, where Catlab receives an average of 2,300 requests per day.

The results should be interpreted as an approximate estimate of the professionals involved in the pre-analytical pathway. Some responses were expressed as ranges or descriptively, without providing a specific number, and in certain cases the available information did not allow for precise quantitative interpretation. For this reason, some responses had to be standardised and approximated to obtain an overall estimate. The figures presented therefore do not represent an exact count, but rather an approximation of the number of professionals involved in the different stages of the pre-analytical process. The real number of professionals involved in the pre-analytical pathway may be higher than estimated.

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The number of professionals involved and the diversity of the tasks they perform reflect the complexity of the pre-analytical phase. To ensure that these activities are carried out correctly, it is necessary to establish common criteria and have a clear, consistent and safe process well-defined process.

First, clear and protocol-based processes must be established, with standardised procedures, well-defined responsibilities and established pathways. This allows each professional to know what they must do and at which stage of the process they must intervene.

The computerisation of the process is also essential. Requesting professionals must be clearly identified and registered in the computer systems, and tools must be available to facilitate data extraction, together with appropriate connections between the different systems.

Another key aspect is the provision of instructions, which must be clear and accessible to both patients and professionals. Appropriate information helps ensure that sample preparation and collection are carried out correctly.

In addition, well-defined procedures are needed for the different activities involved in the pre-analytical phase: how to prepare a cooler, how to perform a blood draw correctly, the order in which tubes should be filled, how many inversions should be performed, and the appropriate conditions for sample storage and transport.

Finally, all of this must be supported by professional training, including both initial training and the updating of continuous knowledge updating, as well as the opportunity to resolve any questions that may arise during routine practice.

In this context, the laboratory's role does not begin when the sample arrives at its facilities. Maintaining effective communication with the centres, creating opportunities to resolve queries, providing tools and training to staff who require them, and appropriately identifying and reporting errors are also part of pre-analytical phase management.

Although many of the activities involved in this stage take place outside the laboratory, the ultimate goal is shared: to obtain a high-quality sample that ensures a reliable result. Understanding how the pathway works, identifying its critical points and working together with the professionals involved are essential elements in improving this stage.

Improving the pre-analytical phase does not depend solely on correcting errors when they occur, but also on designing appropriate processes, establishing responsibilities, providing clear tools and instructions, and ensuring continuous professional training.

Although many errors occur outside the laboratory, this does not absolve the laboratory of its responsibility for improving the pre-analytical phase.

Because behind every sample that arrives at the laboratory, there is a pathway involving many people. Knowing and understanding this pathway is the first step towards improving it.

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