The Recro Approach to Proactive Improvement in Established QC Laboratory Processes

Ongoing Systematic Vigilance and Focused Mitigation Build in Efficiency and Prevent Error

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Pharmaceutical quality control testing leaves no room for error. Yet both clients and members of contract QC labs are acutely aware that failures in accuracy, consistency, and on-time delivery are all too common. Flaws in project approaches, techniques, methods, and processes can easily lead to false data — data customers rely on to guide critical decisions.

At Recro®, given our "right-first-time" mantra, proactively uncovering issues and resolving human errors to prevent defects in our QC labs is a priority. While it may sound simple, this activity is actually very complex. Being able to gather multiple layers of information and analyze it in a meaningful way that supplies evidence to drive stepwise improvements is both complicated and vital. We have developed a reliable, systematic, data-gathering approach that helps us build in efficiencies and future-proof processes to better serve our clients.

The Importance of Having a System

For their projects to succeed and timelines to stay intact, clients rely on QC labs for error-free work, done right the first time. A process for systematically identifying root causes enables good, data-driven decision-making. The ability to apply effective remedies rather than instinctive, speculative responses, addresses a common industry pain point: data consistency.

While the right-first-time approach is universal throughout Recro operations, it's especially crucial in the QC lab. Not only must results be reliably accurate, but they must also be completed consistently on time and as economically as possible. Testing failures that necessitate repetition are costly and threaten timelines.

Inconsistent timing is a problem for both our clients and our own operations. If, for example, an in-process test needs to be repeated, processing comes to a standstill until the test is completed correctly. This delays product release and ties up our own facilities for longer than necessary. A problem with product release testing also delays the ship date – when the client may be relying on it to restock and patients may be relying on availability of a life-enhancing medication.

To minimize such eventualities, Recro has invested considerable time and resources in developing a quality assurance system that works.

The Solution: An Ongoing Process of Pattern Recognition

How do you look at a complex system and methodically approach improvement? To tackle this question, our team applied Lean Six Sigma principles along with our organizational commitment to problem-solving. The goal was to develop a way to identify trends in root causes and then institute improvements in QC laboratory processes so that similar errors would not happen again in the future.

We knew that to be able to recognize patterns in our operations, we would need to find a way to organize and then sort through all the information pertaining to errors in the lab. In the end, we developed an elaborate and flexible tracking tool that is both searchable and sortable.

We then went back through more than a year's worth of laboratory investigations, deviations, and incidents, and

extracted the information from these documents into the new, more trackable format, recategorizing some of the root causes. New parameters for this large database included identifiers such as material, analytical technique, analytical method, chemist, software, and portion of the testing process where the issue occurred.

With a combination of computer-aided filtering and sorting and manual analysis, we were able to pinpoint a few major areas for improvement. While, to start with, we used historic data, the project and the process are now ongoing as part of the way we run our QC lab. Keeping the program updated and finding ways to improve what we do are now a vital part of our day-to-day operations. Our key performance indicator (KPI) for this project is the percent of batches and samples produced without any issue.

Examples of Improvements Made Based on the Data

By recognizing patterns in processing issues, we have been able to proactively improve our standard operating procedures to prevent recurrence and the occurrence of other, related errors. In general, we analyze a trend, change our process to correct it, then follow up to ensure that our mitigation has worked.

Even if we are only improving one little piece in the overall process, every piece counts. At the end of the day, each step is part of the pathway to an overall goal. Smoothing that pathway is a complex and incremental endeavor. The following are examples of the kinds of process improvements we have made as a result of this program.

Example 1

Trend Noted: Staff members newly trained on a certain type of equipment along with its associated software had a greater preponderance of errors when using it to execute tests.

Process Improvement: We completely revamped the training program for the equipment and software in question. A new support position, training coordinator, was added to allow for fully dedicated resource training. Through conversations with both the chemists and supervisor, the main training gaps were determined. Management created a multipart training program for current staff, to fill as many knowledge gaps as possible. The training coordinator created an entirely new training process for this equipment/software that focused on proving proficiency in multiple aspects of using the equipment/software beyond the scope of routine use.

> **These improvements yielded a 75% reduction in errors among newly trained employees (first six months of performance with the test/equipment/software). In addition to the reduction in errors, the average time required to train an individual has been reduced by over 60%.**

Example 2

Trend Noted: Two types of tests showed a large number of recurring issues that were related to either setup of an instrument or missed documentation steps.

Process Improvement: We created job aids for the chemists to improve their performance when working with the two types of tests prone to setup and documentation errors. The checklists are targeted toward equipment usage and documentation requirements for equipment usage, not toward specific requirements of individual material tests. This targeting allows the checklists to be used for testing a variety of materials that undergo these same types of tests.

> **This improvement yielded a 63% reduction in occurrences.**

Example 3

Trend Noted: A large number of flagged events were related to data processing involving one piece of software. The main root cause was determined to be differences in the software setup for different in-process materials and finished products.

Process Improvement: We harmonized the differences between materials when using the software. Standard nomenclature, reports, and calculations were established to allow new materials to be easily and uniformly entered via the software. We also created job aids and reference documentation on the processes and steps involved with data processing.

> **These improvements yielded a 90% reduction in occurrences.**

Ongoing Process Improvements Raise Efficiency and Reliability

Our new quality assurance system offers clients a high level of confidence in Recro's QC capabilities and predictability. Benefits include:

Efficiency: Faster, Lower Cost

- Proactively preventing issues through trend recognition and mitigation means less repeat testing is needed, saving both time and expense.
- Root causes are more rapidly found and corrected when problems do occur because we can check for similar patterns in the past and get pointers on where to look.

Reliable Data

- Systematic process improvements suggested by studying trends prevent future testing errors.

Reliable Turnaround Times

- Greater efficiency and a reduction in the need for repeat testing enable decreased cycle times that are also more reliable: clients — and patients — can rely on projected ship dates.

Recro Expertise

- Hands-on review and assessment with Recro experts reading and sifting through the data improves machine sorting alone and allows us to take maximum benefit of the Recro team's extensive experience and QC process knowledge.

With the help of our chemists, management group, and the solutions implemented above, the total occurrences of issues (laboratory investigations, deviations, incidents) were reduced by over 60% between 2019 and 2020. Occurrences related to human error were reduced by over 70%. As a result, the right-first-time metric for the QC lab increased from 90% to 96% in 2020.

Reduction in QC Lab Errors Since Implementation of Process Improvements

Laboratory investigations, deviations, incidents	Progress 2019 to 2020
Total occurrences	Reduced by over 60%
Human error	Reduced by over 70%
Right-first-time metric (KPI)	90% → 96%

For this degree of improvement, Recro's moderate ongoing investment in time and resources to maintain this QC effort is absolutely worthwhile.

Constant Monitoring Leads to Immediate Knowledge, Proactive Improvements, and Better Service to Clients

An organized, complex process of teasing out all the different possible root causes in our historic and current QC laboratory data and cross-referencing helps the Recro team make proactive, not merely reactive, improvements. We are able to respond by instituting both preventive and corrective actions. We then monitor the outcome to ensure we are effectively improving processes and preventing errors.

This holistic, data-driven view of systems, processes, and human behavior allows us to solve problems quickly and future-proof our QC operations so that similar problems do not recur. This thoughtful process and approach benefits everyone involved. For Recro, it means greater efficiency in approaches and execution, as well as facility use. For the client, it delivers higher quality information and rapid deliveries and turnaround times so they can meet milestones more quickly and bring much-needed therapies to patients on time.

When you are investing in products that can change lives, accepting mediocrity is not an option. Recro, with creative solutions, flexibility, and a focus on quality, delivers excellence in pharmaceutical development and manufacturing.

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