CASE STUDY: CENTRIFUGES

Addressing the Need for Speed

By John Zajechowski, MT(ASCP)

STAT, expedite, ASAP. Common language heard in a clinical laboratory today. Whether it's a dedicated laboratory to support a busy Department of Emergency Medicine (DEM), a satellite laboratory in a hospital network or a large core laboratory, we've all been forced to address this "need for speed."

The StatSpin Express 3 Primary Tube Centrifuge holds eight tubes up to 10 mL.

Since our clinical customers demand faster results, laboratory management has developed methods to monitor our ability to meet these demands. Turnaround time (TAT) has become the tool many laboratories use to monitor their performance. Preanalytic, analytic and postanalytic processes all impact the TAT, and the laboratory has a role in defining and controlling these processes. TAT statistics are measured and tracked within the laboratory but are shared with departments that utilize stat laboratory services (i.e., the DEM) and departments that monitor laboratory services (i.e., hospital administration). Today's laboratories are often judged by their ability to meet specified TAT goals.

The Challenge

The chemistry section of the core/stat laboratory at Henry Ford Hospital in Detroit performs 5 million tests a year, including basic chemistry, immunoassays, urine chemistries and drugs of abuse. Our TAT goal is to have 90 percent of stats resulted within 60 minutes of receipt in the laboratory. Stat requests account for about 40 percent of the chemistry volume, with most stats arriving via a pneumatic tube. Our daily TAT summary report gives us a graphical representation of performance, while the detail report includes statistics on specific workstations down to the technologist level.

About two years ago, meeting the TAT goal was no easy task. Our laboratory assistants and technologists were working hard, but still we struggled. We needed to make changes to improve the TAT. We examined our preanalytic, analytic and postanalytic processes to see what could be done.

The Solution

First we implemented a new instrument to perform cardiac markers and other immunoassays with results out in 18 minutes. With this instrument, we needed to define our specimen type for our cardiac markers. Since most of our cardiac markers are stats from the DEM, plasma was the logical choice. It could be used for routine chemistry and would eliminate the 10–15 minute clot time. Soon, most of our stat samples for routine chemistry and immunoassay tests were arriving in heparinized (plasma) tubes. We received 12x75, 13x100, 16x100 and 10x54 tubes. With our conventional centrifuges, in the "best case," we could get the specimen on the instruments within 15 minutes. The switch to plasma samples decreased our preanalytic time, and we saw an improvement in TAT.

Our next change was to bring some **StatSpin** Express 2 centrifuges into the laboratory. With these high-speed benchtop centrifuges, we could spin specimens for two to three minutes and, in our best case, have the specimens on the instruments within five minutes, shaving about 10 minutes off our preanalytic process. These Express 2 centrifuges worked well for our specimens in 12x75 tubes. Because the Express 2 is designed for tubes up to 12x75 in size, larger tubes had to be spun in the conventional centrifuges. Since we were still receiving greater than 30 percent of our samples in the large tubes, improvement in TAT, while measurable, was tempered.

Our next change was to implement a new chemistry system that can perform a basic metabolic profile in less than 60 seconds. One optional feature of the system is a computer program/system that allows us to auto-verify results sent to our LIS. These changes had a positive impact on both our analytic and postanalytic processes. After a bit of a learning phase, we have seen our TAT meeting the 90 percent goal on a regular basis.

Even with these improvements, there are still times we cannot achieve the 90 percent goal. Examining the detail TAT report and the actual samples sent to the laboratory revealed that some of those samples causing TAT failures were sent in larger tubes. With our phlebotomy functions decentralized, it is not easy to control the tubes we receive. So the laboratory had to find a way to resolve this preanalytic bottleneck.

The resolution to this problem was made easier with the arrival and implementation of the new StatSpin Express 3. This centrifuge incorporates features of the Express 2 with the added capability of spinning eight tubes up to 16x100. With different size tube inserts, we can spin a variety of the larger tubes and, in our best case, have them on the instruments within five minutes. The centrifuge has settings for two and three minutes at 7,200 rpm and a five minute setting at 5,600 rpm (for glass tubes). This compact centrifuge takes only 10 inches of space and can be placed on a bench top in even the most crowded laboratory. Additionally, the centrifuge operates considerably quieter than conventional centrifuges.

The only problem we encountered involved intermixing of glass and plastic collection tubes. While the vast majority of our tubes are plastic, we do receive some glass tubes. Using the "eyeball" method for balancing tubes worked well, as long as the tubes were both the same material, either plastic or glass.

The Results

Our laboratory has five conventional refrigerated centrifuges, four Express 2 centrifuges and one Express 3 centrifuge. Over the next year, we plan to replace four of our conventional centrifuges with three Express 3 centrifuges. We expect these changes will have a positive impact on further decreasing our TAT and also free up some valuable bench space. ■

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