Managing the Risks of Downtime

THE LEADING CAUSES OF UNPLANNED DOWNTIME AND WHAT LAB MANAGERS CAN DO TO PREVENT IT

*◂**Andrew Wilcox** has over 30 years of experience in service delivery, sales, and marketing across multiple industries, including oil and petrochemical, clinical, food, and environmental. For the last 17 years, he has been with SCIEX, where he started as a field service engineer before progressing into a service commercial role. Now, as a senior market development manager for aftermarket and software EMEAI, Andy helps create and promote service solutions that keep SCIEX customers—and their instruments—running efficiently and producing data critical to their workflows.*

Q: What are the most common causes of instrument downtime, and how can these disruptions affect lab operations?

A: In liquid chromatography-mass spectrometry (LC-MS), contamination is a major cause of downtime. This can come from many different areas, such as sample preparation, mobile phase preparation, contaminated glassware, and the environment. Some of these issues can be a result of the method or type of sample being used; they can also be the result of instrument parameters and settings.

Mechanical failure is another primary cause of downtime. The systems are robust but sometimes fail, as with all mechanical and electronic systems. Often, it's due to poor maintenance. Another cause is using outdated software that's not fully supported, or power fluctuations, which can damage sensitive electronic components.

One of the other big ones is human error. This can be due to a lack of education, experience, and other factors. Sometimes, it's just that we're all human and mistakes happen. Training is a great way to minimize the impact of human error; a trained workforce is proven to be more productive and improve retention rate. SCIEX has a specialized team focused on delivering customer training via the SCIEX Now Learning Hub. When we talk about unplanned downtime, lab managers often think about the financial impact, but the reputational damage that can come with it is often not considered. Delays in data delivery or compromised quality can erode trust, and that kind of damage is much harder to quantify and repair.

Q: What steps can lab managers take to reduce the likelihood of instrument downtime?

A: One key step is preventative maintenance, which includes creating a robust maintenance schedule and following the manufacturer's guidelines. At SCIEX, we take a consultative approach to ensure each maintenance plan aligns with the lab's needs. For example, a lab using an instrument occasionally has very different requirements than one that runs it 24/7. Using quality consumables and replacing them when needed also helps.

Contingency planning is also essential. At SCIEX, our contingency plan focuses on having skilled people in place to support customers from the moment they call. Our technical assistance center specialists (TACs) are experienced engineers who can quickly identify and resolve problems.

Another key step is keeping software up to date. This helps protect against cyberattacks and reduces downtime, especially as support for older versions declines. SCIEX offers several software support plans, giving labs easy access to the latest and greatest software versions. Because system validation may need updating with new software, we offer a change control contract to help labs stay compliant in regulated environments.

Using uninterruptible power supplies can further reduce downtime. These systems provide power during outages and condition incoming power to ensure a stable supply. Proper staff training is also critical for ensuring they have the confidence and knowledge to operate equipment successfully.

Q: Can you share some examples of recent innovations that are helping labs reduce downtime?

A: Remote support tools are helping labs reduce downtime, and we use several of these to support our customers. One example is StatusScope, a remote monitoring system that alerts the user and us to changes in instrument or environmental parameters. In one case, our TAC received an alert that the temperature of the turbo molecular pump was outside normal limits. These pumps run at high frequencies and speeds, and if their bearings overheat, they can fail prematurely. When the TAC representative followed up on the alert, the lab technician discovered that the temperature in the lab had increased because the HVAC system had failed. This system allowed us to alert the lab to the HVAC issue, which was affecting quite a few instruments.

Another tool is Visual Assist, an AI-driven platform that lets us virtually place an engineer in the lab via a mobile device. In one instance, a lab received constant error messages after replacing a part on an LC system. Using Visual Assist, the TAC representative remotely inspected the system and noticed that the pipework wasn't routed correctly and was catching on another part. Within minutes, they identified the problem, talked the customer through adjusting the tubing, and fixed it, getting the system back online in minutes.

Q: What role do instrument manufacturers play in minimizing downtime, and how can they best support labs?

A: The goal of any manufacturer is to provide the highest level of sensitivity, accuracy, and repeatability. This needs to be done robustly. If you have a sensitive instrument, but after 10 samples, it needs a major cleaning, it's not sustainable. Manufacturers also need to consider serviceability. Parts that require regular cleaning should be easily accessible to the user, minimizing the need for field service intervention.

Serviceability is built into the design stage for all new SCIEX instruments, like the ZenoTOF 8600 system. This started with our Triple Quad 5500 system, which features a drop-down front cover and an easily removable ion path.

Q: What feedback have you received from labs regarding downtime?

A: I've spent a lot of time working on this topic, and one of the insights we gained is a better understanding of the financial impact of downtime. When labs experience unplanned downtime, there's often no backup. This is especially true for clinical labs, which tend to have high sample volumes and very little redundancy in terms of instrumentation. Patients also depend on these labs to deliver information quickly. When I was an engineer, I looked after a couple of hospitals in the UK. When the systems went down, it was really stressful because the samples were just constantly backing up. If a lab is running a 96-sample batch and the instrument fails after two samples, they lose time and risk losing the samples.

The most obvious impact of this is on revenue. If an instrument processing revenue-generating samples goes down, every minute of downtime carries a cost. We found that the average cost is $10 per minute, and that's a conservative estimate.

There's also reputational damage, which is not easy to quantify. There's a lot of competition out there, and when labs can't deliver on their promises due to unplanned downtime, it can have serious consequences.

Ultimately, the feedback we hear often from labs is that downtime is their biggest enemy. They want to partner with companies that can provide solutions to minimize downtime.

Q: What advice would you give to lab managers looking to reduce unplanned instrument downtime?

A: You might hear advice like, "buy more instruments and build in redundancy," but I think the more sensible approach to minimizing unplanned downtime is to focus on training, maintenance, and reliability.

Working with primary manufacturers as the service provider is critical. While there are many third-party service providers out there, the level of support they offer can vary. When selecting a service provider, look at the whole picture. Consider what kind of extended support network is available, whether they use OEM spare parts and consumables, and the balance of risk to cost.

At SCIEX, we have a large, global team of service engineers and dedicated technical support teams for software and hardware. When things go wrong, as they sometimes do, we have a class-leading escalation system.

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