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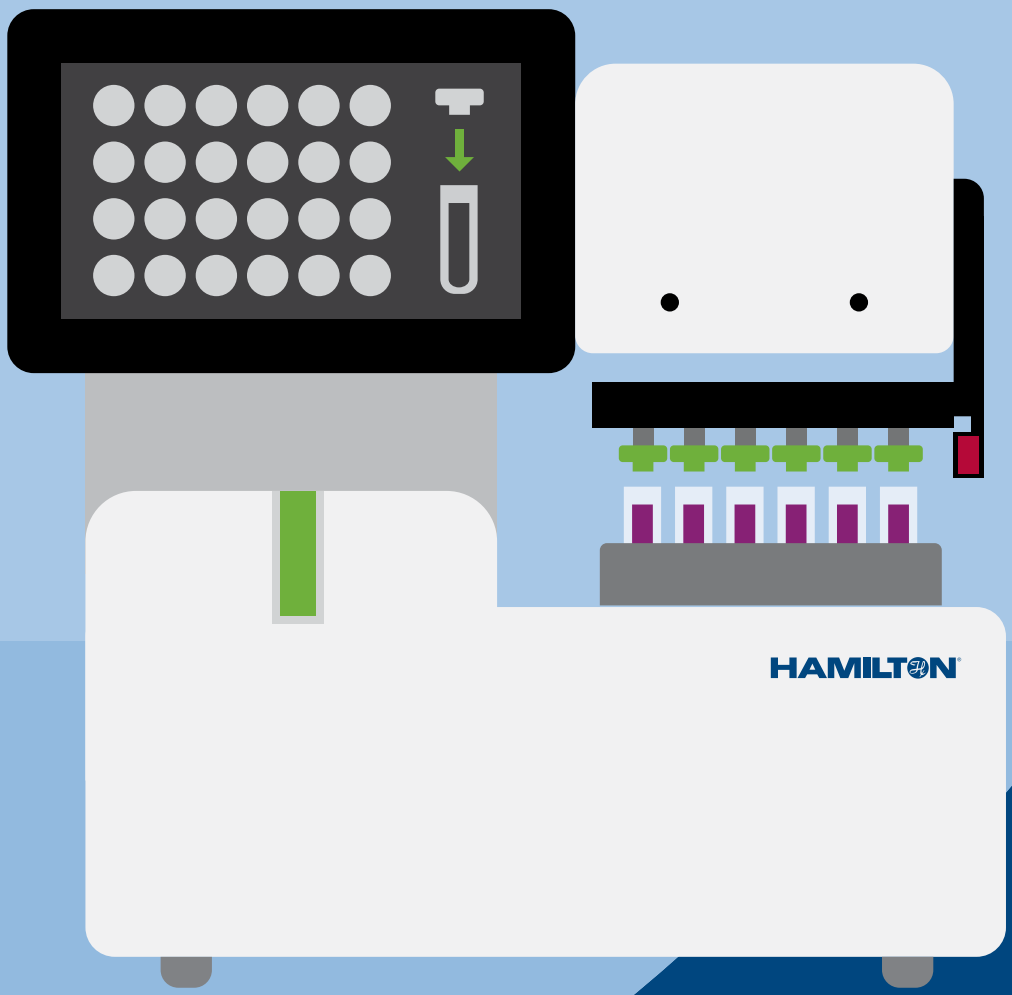

How Automation Puts a Cap on Laboratory Disruptions

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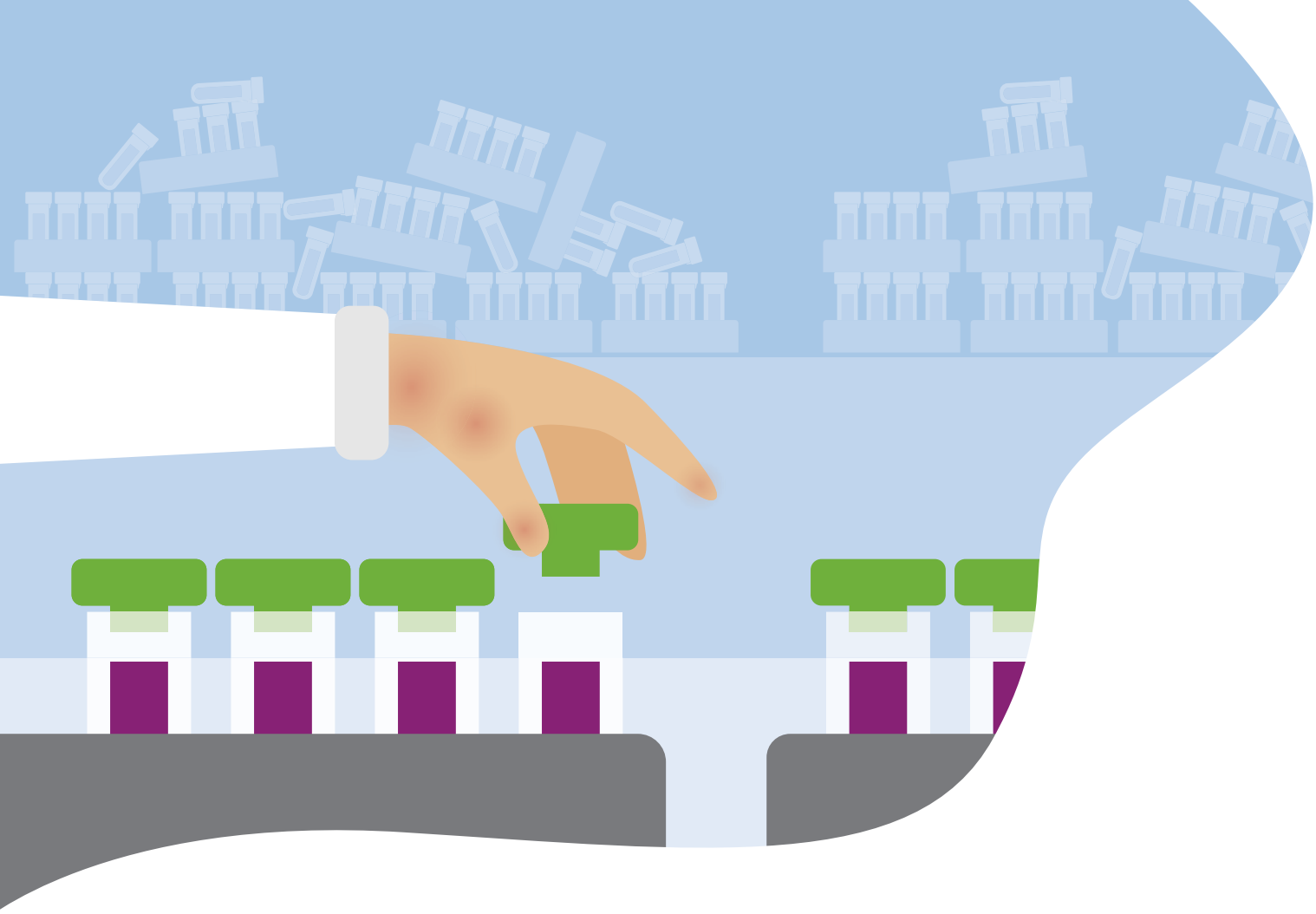


Introduction

Does this sound familiar? Life in the lab seems to be chugging along just fine. Everyone is settled into a daily routine. And then…disruption hits. Productivity slows to a trickle.

From large-scale events, like the COVID-19 pandemic or a regional tuberculosis outbreak, to individual injuries or illness, or even lab-specific issues such as a manual freezer failure, disruption can overwhelm the lab as team members struggle to regain their footing and return to a sense of normalcy.

No doubt, disruption is unwelcomed, but it is often not the direct cause of the productivity decrease. Instead, disruption may amplify existing pain points in laboratory workflows that were previously overlooked or ignored within generally accepted ways of working.

Take sample capping and decapping as an example. It's a straightforward task – remove a cap from the sample vessel, extract sample for downstream processing, then place a cap back on the sample vessel prior to storage or disposal.

When performed manually, sample capping and decapping is itself a pain point in a larger workflow. In fact, this low value task can both trigger a lab disruption and exacerbate disruption caused by unrelated circumstances.

In this ebook we'll go over common issues many laboratories have. We discuss how manual capping and decapping can cause disruption in each of the scenarios. We also introduce an automated solution, in the form of the LabElite I.D. Capper, to alleviate or prevent disruption.

This all-in-one automated device combines capping and decapping of a wide variety of sample tubes and cryovials in 24-, 48-, and 96-format racks along with 2D barcode reading. By doing so, LabElite I.D. Capper eliminates a pain point in the larger workflow so that the entire laboratory can gain from improved productivity.

There's Not Enough Time in the Day to Get Through All These Samples

Perhaps under typical conditions, you don't fret over sample throughput. Or maybe every day is a race against the clock to process as many samples as possible. Then disruption strikes.

Maybe, as we know all too well, it's a nasty bug that swells sample influx to new heights or compels shutdown orders that literally close the doors to progress. Maybe it's far less menacing but still close to home, like compensating for a team member's absence from the lab, the addition of last-minute rush projects, or training sessions and seemingly endless meetings.

Time is something we could all use more of, but when it comes to sample processing throughput, are you using time wisely? Or is restricted sample throughput disrupting laboratory productivity and creating backlogs? How much time is your lab spending on manual sample capping and decapping?

Automation Simply Gets More Done in Less Time

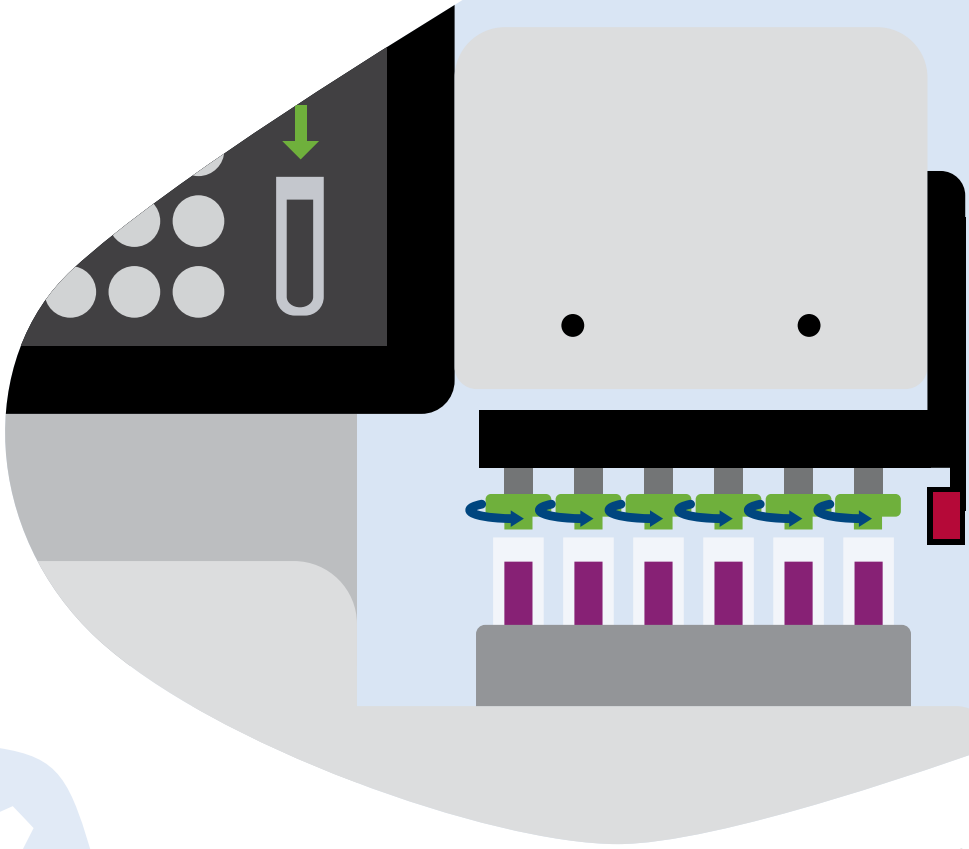
Instead of sacrificing free nights and weekends to counter a throughput disruption, consider how the LabElite I.D. Capper can prevent backlogs and also increase throughput.

First, we start with the obvious – it's an automated device. Its purpose is to get more done in less time, and with less human intervention compared to manual methods. This means that it can decap and identify a rack of 24, 48, or 96 tubes in less time than a human can. For even more walkaway and time-saving convenience, integrate the LabElite I.D. Capper into a larger system like an automated liquid handler.

Next, we look at the all-in-one form factor. By combining capping, decapping, and 1D/2D barcode reading in one unit, workflow steps can be combined or reduced. This escalates sample progression to downstream steps. Within the compact form factor is the unique interchangeable decapping head feature. For labs utilizing different tube rack densities, users can easily and quickly change out the decapping head instead of stopping the workflow to move to a different dedicated decapper or regressing to manual decapping.

Even the user interface provides time savings. The simple touchscreen display is intuitive for users of any skill level. This interface allows for a speedy setup and also reduces new user training time down to almost nothing.

Time savings isn't only due to the LabElite I.D. Capper being such a dependable workhorse. It's also a benefit of the experienced team behind the device. Our highly responsive experts are at the ready no matter what the question or need may be in order to minimize the risk of sample processing down time.



Our Efforts are Wasted if Samples are Contaminated

A contamination disruption can bring a bustling lab to a screeching halt and drop even the most stoic scientist or clinician to their knees in anguish.

When decapping by hand, cross-contamination events from big splashes to small aerosols can occur. This renders the affected samples useless, and additional samples must be procured for proper testing. In circumstances where the sample supply is limited and cannot be replenished, such as samples stored for use in population biology or surveillance studies over time, the study itself is stunted.

At the same time, foreign contamination can infiltrate during manual capping. Overzealous or careless users can compromise the sample vessel seal by overtightening or cross-threading the sample cap; creating a contamination entry point. If caught early enough, it may be possible to transfer the sample to a new vessel, but this consumes both time and supply costs.

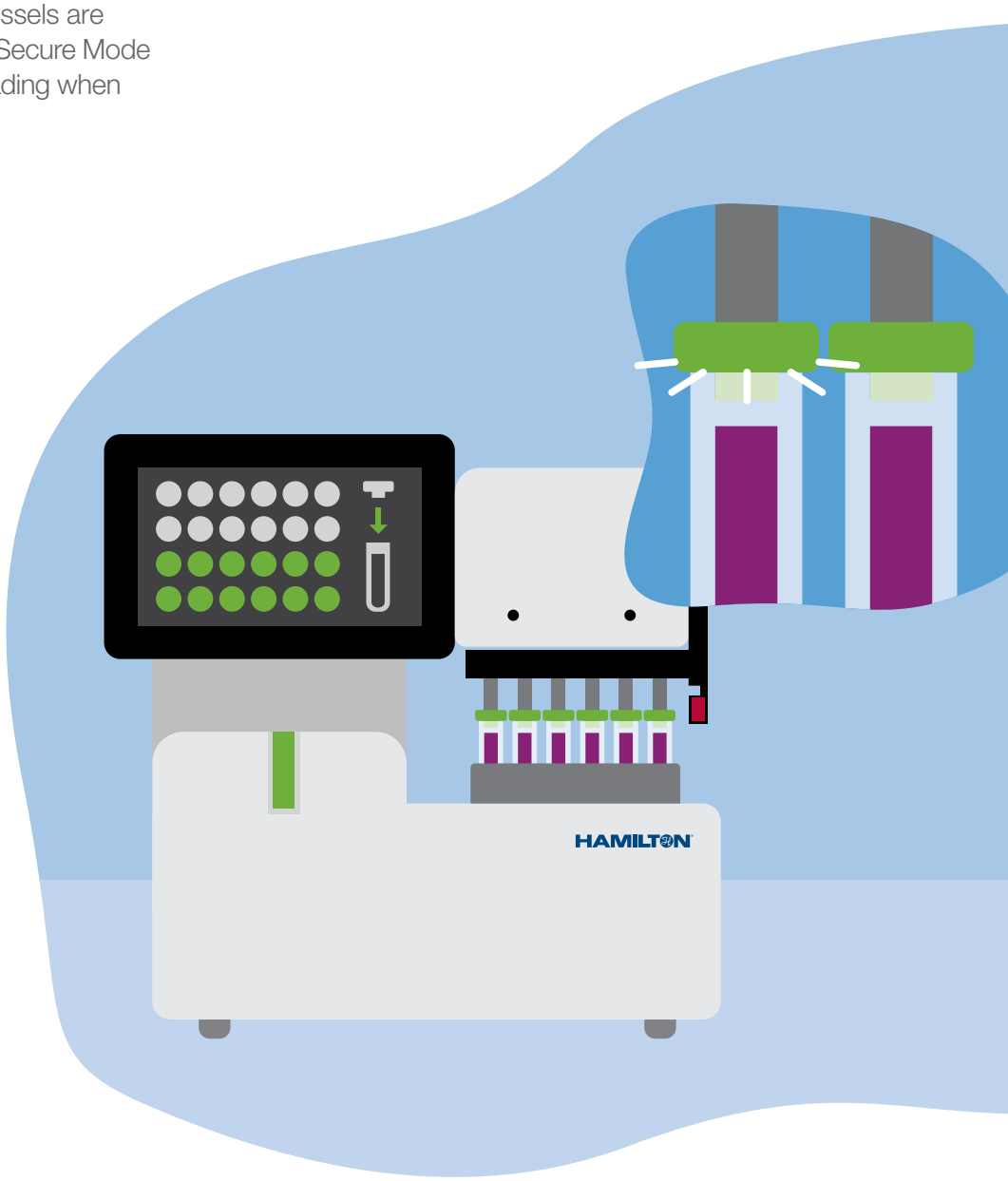
If sample vessels break during manual manipulation and its contents spill out into the environment, the lab incurs time-consuming and costly hassles of cleaning and decontamination protocols. This is especially true and worrisome for labs handling hazardous or potentially infectious samples. On top of this, new samples must be procured, if possible, for a second processing attempt.

Automation Helps to Protect Samples from Harm

Don't lose hope when it comes to sample integrity threats. Instead, take a closer look at how the LabElite I.D. Capper can eliminate risks to sample integrity.

As an automated device, the LabElite I.D. Capper performs the desired actions consistently across each rack position every time it is used. This includes using just the right amount of torque for each tube or vial type to remove the caps without splashing or creating aerosols, and to prevent overtightening when the vessels are recapped. It also includes a built-in Secure Mode to eliminate the threat of cross-threading when capping sample vessels.

To further prevent contamination caused by human error, the LabElite I.D. Capper can be integrated with other equipment as part of an automated or semi-automated robotic system. And finally, when sample integrity is critical, take control with selective decapping, where full racks, partial racks, or selective rows/columns are processed. You can also take advantage of the optional Row Loop feature to expedite pipetting processes with immediate recapping.



How Can We Protect Our Most Valuable Resources?

A lab's most precious resource is its people; The planners, the taskers, the critical thinkers, the decision makers. Employees also happen to be the most expensive resource when it comes to the lab budget. On the flip side, as mere humans, people in the lab are also vulnerable to harm that can impede their abilities or even keep them out of the lab altogether.

In fact, one study tallied a year's worth of fatal and non-fatal injuries as well as fatal and non-fatal illness across all occupations in the U.S. The results were staggering – approximately nine million reported cases with an indirect (productivity) cost of almost $183 million dollars[1]. This is a whale of a disruption and it can trigger other distractions like backlogs.

When we drill down to specific instances in a lab, we know that the repetitive motion of manually capping and decapping sample vessels over time can stress and injure wrists and arms, and even move up to the neck and shoulders. This can render team members unable to complete the task or take sick leave to treat and rehabilitate the injury.

At the same time, just as splashes and aerosol generation are a great risk to sample integrity for labs handling hazardous or potentially infectious samples, they are an even greater risk to the health of team members.

1. Leigh J. P. (2011). Economic burden of occupational injury and illness in the United States. The Milbank Quarterly, 89(4), 728–772. https://doi.org/10.1111/j.1468-0009.2011.00648.x

Automation Helps to Protect People from Harm

Adding the LabElite I.D. Capper to your lab's risk management protocol can create a win-win scenario when protecting lab workers and productivity from injury and illness related disruptions.

Hands-free processing means that users never contact the sample vessels as they are being manipulated; they simply place the rack on the device's deck, tap the screen to enter basic instructions, then remove the rack from the device when processing is complete. For enhanced walkaway protection, integrate the I.D. Capper into a completely automated workflow.

The I.D. Capper's advanced features that protect samples from harm can also be leveraged to protect users. For instance, the exclusive interchangeable decapping head feature comes in handy. With one unit that can process multiple tube rack densities, users can restrict their movement through the lab, thereby reducing the likelihood of breaking hazardous samples.

Moreover, selective decapping and the optional Row Loop also aid user protection through limited exposure so that users can focus on what matters most.

We're Bursting at the Seams

No matter how large or small a lab is, bench space is at a premium. Navigating a crowded and cluttered lab can disrupt productivity. Pushing items aside to clear space can also disrupt productivity if it results in that item breaking or getting lost in the shuffle.

With both bench space and overall lab space in short supply, labs may reject automated solutions as being too large and bulky to fit into their space.

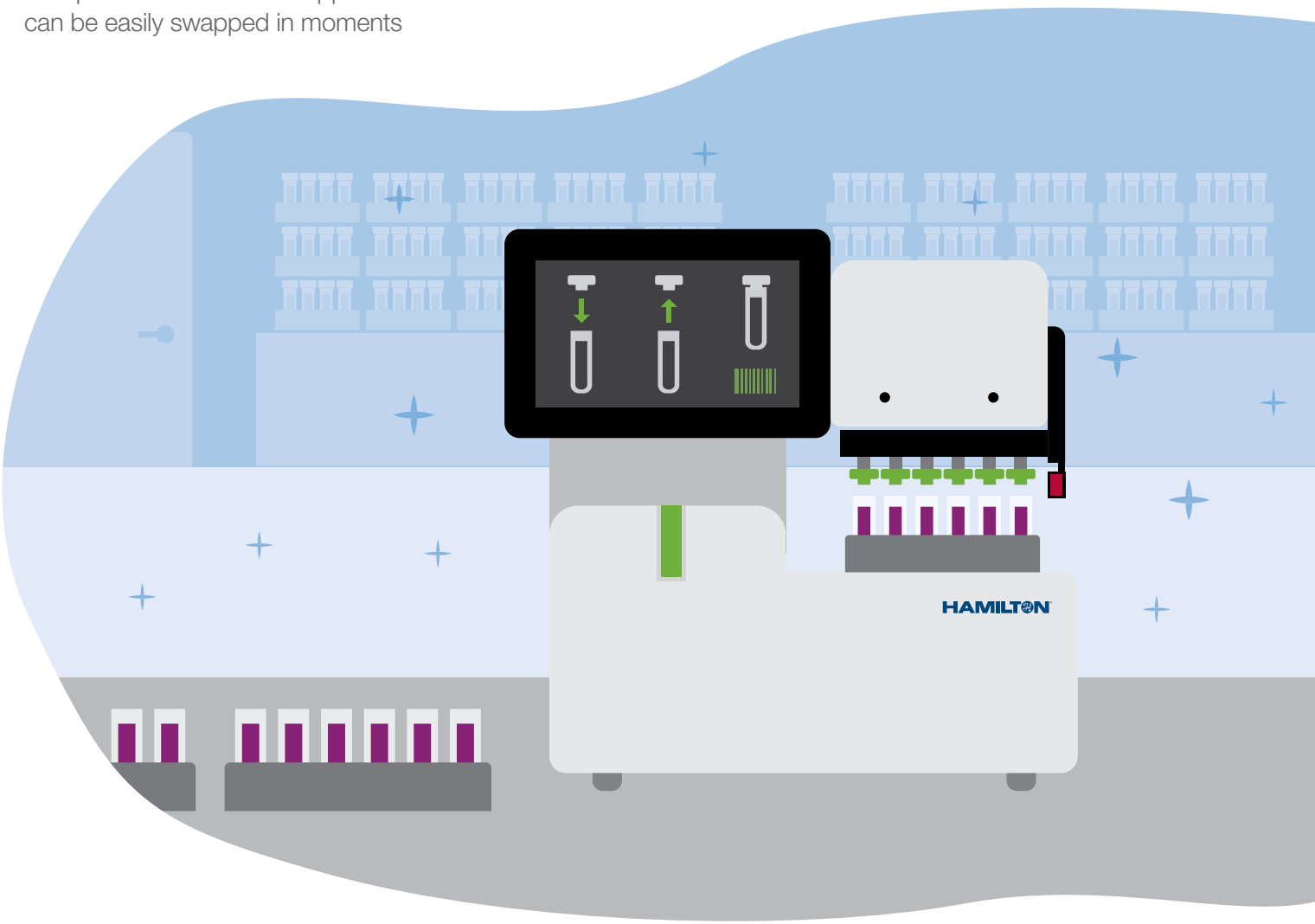
Automation Works on a Personal Scale

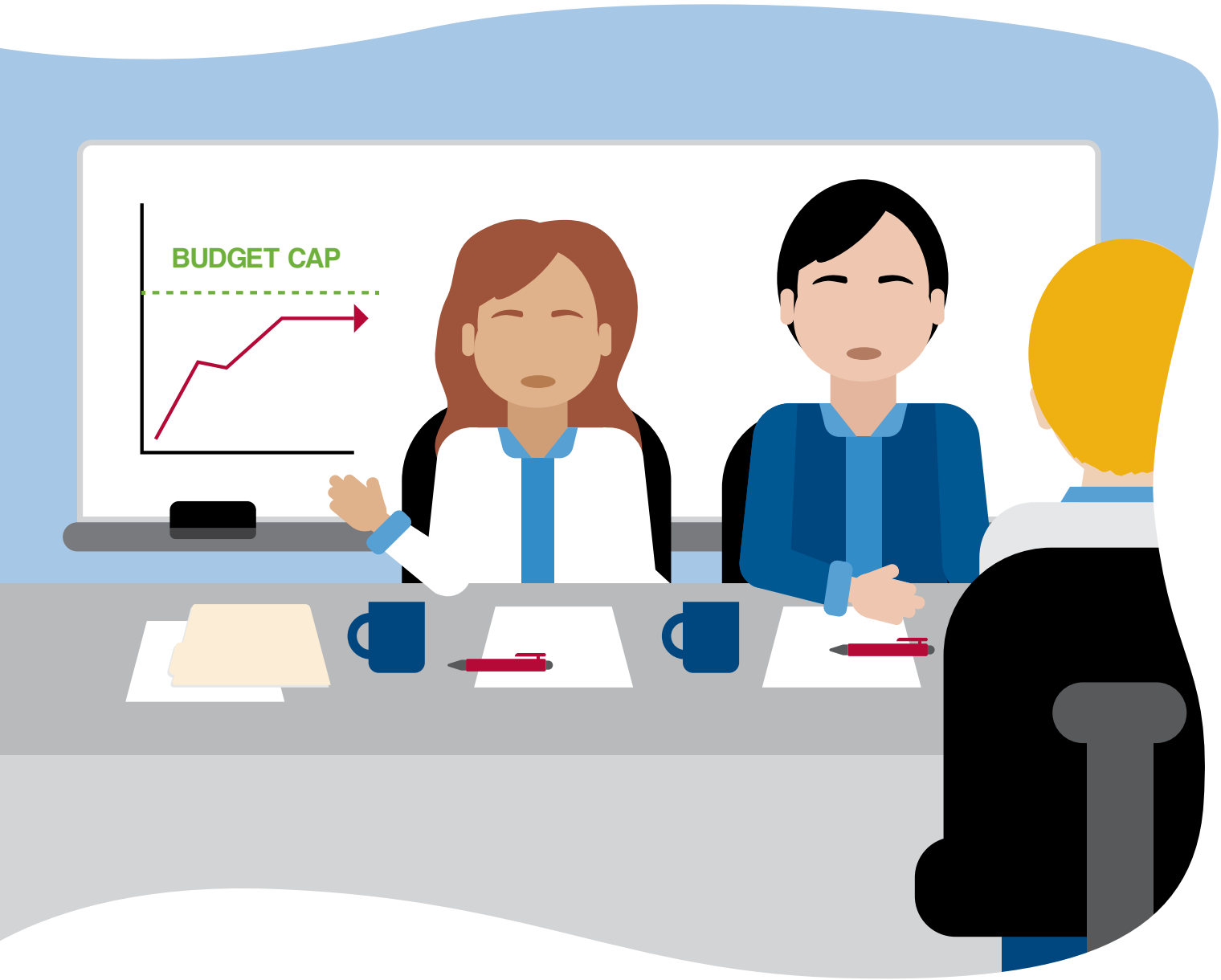
Automation doesn't have to mean big. In fact, the LabElite I.D. Capper packs a big, feature-rich punch in a compact benchtop package. By combining the functionality of three individual devices – capper, decapper, and 1D/2D barcode reader – it creates a greater impact on the lab while taking up less footprint than the dedicated devices.

Multi-functionality is the driving force behind the I.D. Capper. With exclusive interchangeable heads, it means that 24-, 48-, and 96-format racks can be processed using one unit instead of separate dedicated decappers. The heads can be easily swapped in moments

Tube and vial configurations from just about any manufacturer, including various volumes and sizes as well as internally or externally threaded tubes, are compatible with the I.D. Capper.

Labs already utilizing an automated liquid handling workstation can integrate the I.D. Capper. By doing so, zero benchtop space is taken up and users still receive all the benefits of automated decapping.





Budgets are Always Exceptionally Tight

It's a rare event, indeed, when labs are in a position to spend money with abandon. In reality, it is far more likely that cost is among the first discussion points when considering any lab purchase. Budgets can be just as much of a laboratory disrupter as pain points in a workflow.

When price is the sole deciding factor in rejecting a purchase, it may not take into account the potential value to the laboratory. The old adage 'penny wise, pound foolish' succinctly encapsulates this sentiment.

Comparing manual cappers and decappers to an automated system is a good case in point. Does an automated system cost more than a handheld tool? Of course it does, but ending it here doesn't tell the full story.

For a laboratory to operate at peak efficiency, it must spend money wisely. Manual capping and decapping is a low-value and labor-intensive task. It consumes a user's time, and time is money.

Automation Brings Efficiency to Budgets

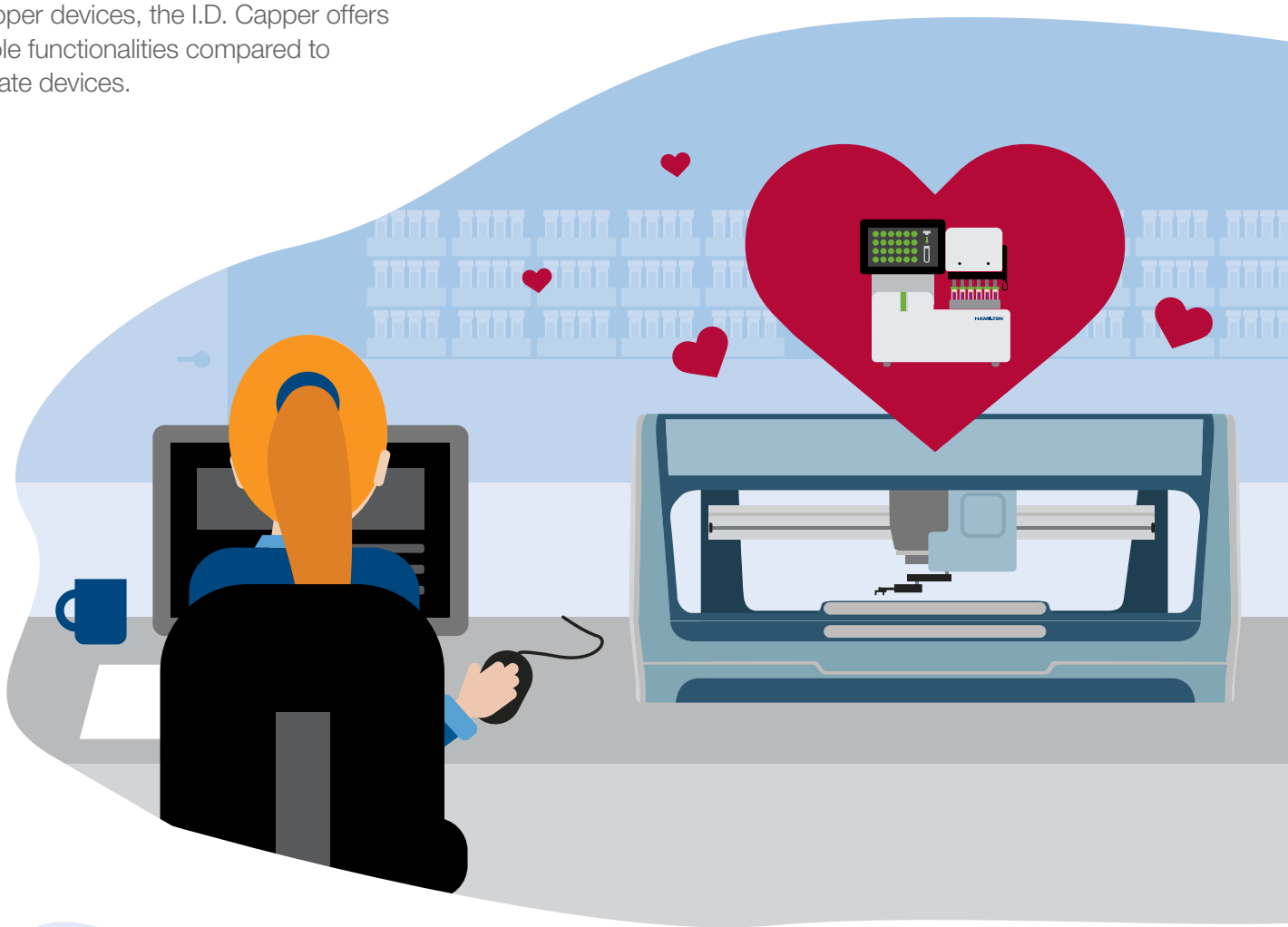
As an automated solution that can work as a standalone device or integrated with a liquid handling workstation, the LabElite I.D. Capper performs low-value tasks without human intervention. This means that instead of spending hours on this mind-numbing task, users are free to attend to higher value tasks. This labor reallocation boosts lab productivity so that more can be accomplished with the same budget.

The consistent nature of the automated workflow also eliminates errors from manual handling to reduce time, materials, and costs related to retesting.

For those already familiar with automated decapper devices, the I.D. Capper offers multiple functionalities compared to separate devices.

In this comparison, the all-in-one format significantly reduces acquisition costs. This one device can manage multiple rack densities with a simple and rapid change-out of the decapping head. The heads may be purchased as needed to suit your evolving laboratory requirements. The flexible design is compatible with a wide variety of tube and vial types so the lab isn't locked into a single choice.

And there's more. The I.D. Capper's combined functionality also streamlines workflow steps, speeds throughput, saves on ever-valuable bench space, and even reduces maintenance complexity. These details matter when it comes to finding ways to minimize disruptions to the overall lab budget.



Don’t Let Disruption Ruin Your Laboratory

Sample capping and decapping doesn’t have to be a disruptive task in your laboratory. Now is the time to rethink your workflows to include a better option. The LabElite I.D. Capper satisfies users and eases disruptions with a combination of capabilities that no manual tool or other device can match.

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