innovating together

Pioneering automation

15 years of collaboration for a fully automated laboratory

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We have now reached the final chapter of our The Journey campaign, automation stage. To round off this stage, we visited the Clinical microbiology lab of Niguarda Hospital, the largest and one of the most important hospitals in Milan, Italy. There, we had the opportunity to interview Zoe Mery Bevilacqua, Dr. Alessandra Bielli, and Dr. Chiara Vismara, who dedicated the last fifteen years to transitioning the lab workflow from manual to fully automated. Their success story was made possible by their vision of the future of microbiology and by the collaboration with Copan's team, which provided much more than essential support.

As always, let's start with a brief description of your laboratory.

The Clinical Microbiology Lab at Niguarda Hospital is divided of four distinct areas: bacteriology, molecular biology, serology, and mycobacteriology. Of note, the lab is the regional reference for tuberculosis and legionella. On average, we process almost 600,000 samples a year (around 12000/week), half of which are in the bacteriology lab. The lab staff consists of approximately 60 people, including microbiologists, collaborators, and 40 technicians, even if their number varies a lot.

Do you have a high turnover? Why?

Since the COVID-19 pandemic, there has been a significant increase in vacancies for lab technicians, so everyone has more choice to work in a city they prefer or close to their homes, which is positive. However, this staff shortage is also due to the challenging nature of the job, which is complex and requires shifts and long working hours. This is true for lab technicians, microbiologists, and doctors. As far as we know, lack of personnel affects our lab; it's a global issue.

So, in this situation, automation really comes into help.

Of course, we began automating the lab in 2009 after implementing Liquid-Based Microbiology. We were among the first in the world to implement a prototype of WASP®; we remember it was black and yellow!

How was working on a prototype?

It had been a fun, interesting one-year project. We remember the Copan staff visiting us and analyzing the movements that our technicians were making under the hood to manually streak plates to replicate them perfectly with the WASP®. We can say that inside WASP® protocols, there's a bit of us.

One of the first WASP® prototypes.

I guess you have replaced that WASP now, right? Did you implement other automations?

Yes, between 2010 and 2012, we switched to a 2 WASP® / 1 WASPLab® system with two incubators, and again, the whole system was replaced in 2022. Then, we have a Colibrì™, a UniVerse® in the molecular biology area, and just a few months ago, we implemented PhenoMATRIX®, aiming to have PhenoMATRIX® TAG running in the upcoming months.

Describe the main drivers that made you consider Lab Automation.

The former lab Head Physician, Prof. Giovanni Pietro Gesu, knew Daniele Triva personally and realized the importance of LBM® for modern microbiology early on. His goal was to transform the lab into a hub-and-spoke laboratory, and to achieve this, he made investments in LBM® and automation to increase the lab's processing capacity.

Was it challenging to transition to automation?

Of course, like with anything new, it required a period of adjustment, education, and a significant reorganization of the laboratory. However, it's important to note that WASP® protocols were designed based on real lab technicians, making them easy, straightforward, and intuitive to use, even for lab technicians who are not used to working with WASP®.

The two WASPLab® incubators in Dr. Vismara's laboratory.

WASP® at Niguarda Hospital

It seems that the tight collaboration with the Copan people was the key to making everything run smoothly.

To successfully complete these projects, the laboratory needs to be rearranged and the daily routine, responsibilities, and duties need to be reconsidered. However, thanks to the expertise of the Copan team, this process has been enjoyable. We worked closely with the Copan team for a long period of time, even having lunches and dinners together. If I am correct, some of them even moved temporarily to Milan to assist us promptly! Mario Savarese, Irene Acerbi, Nicola Arrighi, Andrea Nobile, Laura Navarria, Arnalda Giambra, and many others provided crucial support for the smooth implementation of WASP® but also of WASPLab® and Colibrì™, which were the first of their kind installed worldwide. Now, for the implementation of PhenoMATRIX®, we are collaborating with Elena Crisostomo, who provides remote or in-person support whenever we have any issues or requests.

You were the first to install many of our automation systems!

Yes, and many other laboratories, from Russia to Japan and the Middle East, visited us to learn how WASPLab® works.

Is the Copan support still vital to you?

Yes, definitely. A great instrument is nothing without efficient assistance, and Copan has both.

Let's move to the current situation. Has your job changed in the past few years?

In the last few years, our job has become much more complex, and automation has helped us deal with this increasing complexity. Syndromic panels, molecular biology, identification, and Multiresistant bacteria have now increased the tasks to be performed in our lab. Automating our routine protocols allowed us to focus on these activities, which most of the time must be done manually.

Is there something else automation improved or enabled?

Of course, there are some obvious benefits such as standardization due to fixed-time incubation and in-incubator imaging, as well as traceability, which is helpful for accessing plate images when requested, even months later. On a less obvious note, it helped us function as a Hub-and-Spoke laboratory and deal with the increase in sample volumes over the past decade. Moreover, WASP® allowed us to focus some staff members explicitly on sorting and analyzing sample conformity during the check-in. Additionally, we were able to dedicate time to enhancing the quality of our lab. This involved increasing the time for staff education and reassessing our interactions with other hospital departments, resulting in the creation of a protocol for requesting analyses from our department. These changes have enhanced the reputation of our lab within Niguarda.

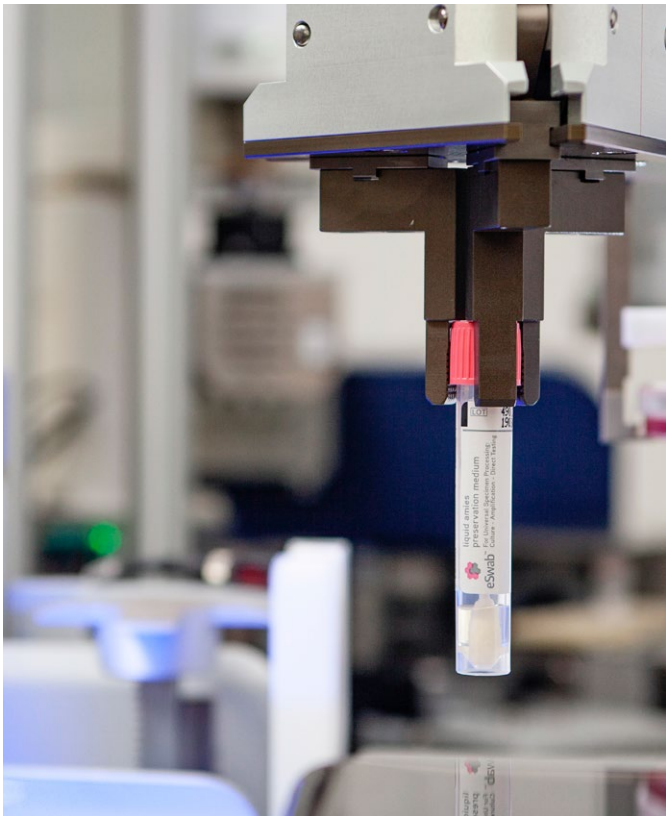
Any protocol you are implementing at the moment?

Yes. We receive around 30 bone biopsy samples a day from the bone biobank, to assess their sterility before the transplant. Thanks to LBM® and WASPLab®, the processing of these samples has become extremely easy. We are now working to implement automation for processing another type of biopsy samples, which require tedious processing and pose a high biological risk for the operator.

Do you have a specific experience to share?

Yes, this is funny. As mentioned before, last year, we replaced our WASPs and WASPLab®, and we were without them for less than a week. Even if we prepared in advance to reduce the volumes incoming in the lab, the experience was tough and made us value automation even more. It was nice to go back to our ancestral methods, but we won't miss all those plates invading our trays that needed to be streaked manually!

The clinical microbiology lab at Niguarda Hospital is equipped with two WASPs.



A eSwab® tube being processed on a WASP®.