

# A diagnostics laboratory handling COVID-19 tests helps confirm containment with the AerosolSense Sampler

Even in an environment that applies the most stringent safety protocols in handling SARS-CoV-2 samples, the risk of contamination still exists.

The Oklahoma State University Diagnostics Laboratory (OSUDL), in a collaborative effort between two of its campuses and the Oklahoma State Department of Health, processed samples from across the state for SARS-CoV-2 identification. Lab management had a high degree of confidence that personnel were following all standard practices, as the lab director indicated: “If the lab personnel weren’t working, they were cleaning.” However, they wanted additional metrics to help verify that indeed their safety protocols were working, beyond what they were able to learn from conducting surface tests and individual testing.

## Situation

At the height of the pandemic, the OSU Diagnostics Lab processed 2,000 human samples daily for SARS-CoV-2. The Biosafety Level 2 (BSL2+) lab was located in a 40x40’ facility that was not separated by air locks.

The lab’s staff of 20 consisted of university employees and laboratory undergraduate students, all of whom had been vaccinated. Staff members worked in two shifts of 10 individuals, which did not cross paths, and no other employees had access to the lab.

Personnel followed a combination of standard protocols, including wearing personal protective equipment (PPE), restricting access to the facility, wiping down surfaces, and maintaining a sign-in sheet to track personnel access. While staff at OSU Diagnostic Lab always used PPE,



management wanted to help confirm that the lab environment itself did not have the presence of SARS-CoV-2. This insight would allow them to keep the records in their safety documentation and provide evidence of compliance during lab inspections.

In addition, lab management wanted to:

- Confirm proper containment efforts and safety protocols in infectious disease lab handling hundreds of COVID-19 tests per day.
- Complement their surface test CLIA-CAP requirements with air sampling for inspection purposes.
- Help employees feel confident that their protocols are working and that they are safe in their workplace.

## Solution

The Thermo Scientific™ AerosolSense™ Sampler, a new pathogen surveillance solution, was provided to the OSU Diagnostic Lab to support their goals while helping to protect employees and maintain operational continuity. The solution delivers timely and highly reliable insight into in-air pathogen presence for monitoring and improving facility safety protocols. See figure 1.

The AerosolSense Sampler collects air samples through an omnidirectional inlet. A cartridge installed into the sampler contains the collection substrate. The air sample is directed toward the collection substrate through an accelerating slit impactor. Particles are trapped on the collection substrate as the air is drawn through the sampler. After the sampling cycle completes, the sample cartridge is removed and sent to a testing laboratory.



**Figure 1 AerosolSense Sampler**

At the OSU Diagnostic Lab one AerosolSense Sampler was placed in four different areas of the lab during a period of four weeks. The tested areas included the gowning space, the center island of the lab, behind their automated extraction instruments (Thermo Scientific™ KingFisher™ Automated Extraction and Purification System) and the main lab.

Traffic in the lab varied from 10-25 people per shift, and a sign-in sheet was used as a tracking system.

## Results

Over the four-week period of the study, all twenty air samples were negative.

## Response

The OSU Diagnostic Lab was able to help confirm that the lab environment did not have the presence of SARS-CoV-2 and to confirm that their safety protocols for infectious disease handling were working. The lab was also able to reassure employees that they are being protected in their work environment. As the lab manager pointed out, “As an infectious disease lab dealing with COVID-19 samples, the solution adds peace of mind that our lab air is free of COVID-19 and provides reassurance that our lab is handling samples correctly, and we have proper containment measures. Seeing a negative result every time provides great peace of mind.”

The lab manager observed that while swab tests revealed whether employees were wiping down countertops and hoods and working with samples in the correct places, testing the air provided a very different perspective. They were able to monitor for the presence of SARS-CoV-2 in the media where it transmits, the air.

In addition, both the ease of use and the minimal time investment involved with the sampler helped maintain the lab’s operational continuity. As the lab manager said, “The first thing I do every single morning is change the cartridge out, put a new one in. I give it to my office manager to have it mailed out, I update the spreadsheet, check the results and I am done. It is part of my daily checklist to do.”

## Conclusion

The AerosolSense Sampler exceeded the expectations of the OSU Diagnostic Lab management. The results provided clear evidence and metrics that the lab safety protocols were working and that the lab staff were following the procedures properly.

Their experience with the sampler is transferable to other laboratories or healthcare facilities with strict safety protocols in place. In these settings, lab managers expect complete absence of pathogens in the air and surfaces to protect the safety of their staff and to comply with institutional and government policies and regulations.

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