

# Amidst a pandemic, first responders find confidence and protection with our in-air pathogen surveillance solution

## Situation

In the COVID-19 pandemic, few workers are as essential as first responders. Like countless others across the country, the first responders at the Sandwich Fire Department, located in Massachusetts, are regularly in close contact with SARS-CoV-2 patients.

The Sandwich Fire Department wanted to monitor their facility because they were in constant contact with SARS-CoV-2 patients. Before partnering with Thermo Fisher Scientific, they were depending on two risk-mitigation strategies:

1. Employees following CDC recommended safety protocol (mask wearing, cleaning, hand washing).
2. Rapid individual testing of employees

While safety protocols were enacted, the concern that these strategies were not effective enough to avoid an outbreak remained.

In partnership with Thermo Fisher Scientific, the Sandwich Fire Department, wanted to achieve two goals:

1. Monitor the main hallway of the facility for the presence of SARS-CoV-2, a space where individual testing was taking place.
2. Verify safety protocol compliance and the quality of personal protective equipment (PPE).

## Solution

The Thermo Scientific™ AerosolSense™ Sampler, our new pathogen surveillance solution, is designed to deliver timely and highly reliable insight into in-air pathogen presence



for monitoring and improving facility safety protocols. This solution was provided to the Sandwich Fire Department to support their goals while helping to protect employees and maintain operational continuity.

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 moves around the collection area. After the sampling cycle the sample cartridge is removed and sent to a testing laboratory.

At the Sandwich Fire Department, the AerosolSense Sampler was placed in the main hallway of the facility.

Air samples were collected daily, Monday through Friday, over a period of four weeks. After each sample cycle, samples were sent overnight to a partner laboratory. The laboratory tested the samples using the Applied Biosystems™ TaqPath™ COVID-19 Combo Kit to detect the presence or absence of SARS-CoV-2. As part of the program, 18 samples were tested.



**Figure 1 AerosolSense Sampler**

**Results**

After completion of the program 15 samples were negative and 2 samples were positive for SARS-CoV-2. See Table 1.

Immediately after receiving the positive sample results from the AerosolSense Sampler, indicating SARS-CoV-2 was present in the hallway, all individuals were given a rapid antigen test. The results identified that one individual was positive for COVID-19, confirming AerosolSense Sampler detection accuracy and complement to individual testing.

**Conclusion**

The results demonstrated that combined with proper safety protocols, the AerosolSense Sampler is an effective in-air surveillance solution that can provide awareness of SARS-CoV-2 presence in the air – enabling facility leadership to take the proper safety precautions and prevent a potential outbreak.

For the Sandwich Fire Department, these results verified that individuals were or were not complying with the safety protocols. They also confirmed that PPE and other safety

Day	AerosolSense results	Number of people in facility	Number of confirmed SARS-CoV-2 cases in the facility
Day 1	Positive	6	1 (rapid test and PCR)
Day 2	Negative	5	0
Day 3	Positive	6	1 (rapid test and PCR)
Day 4	Negative	8	0
Day 5	Inconclusive	8	0
Day 6	Negative	10	0
Day 7	Negative	10	0
Day 8	Negative	8	0
Day 9	Negative	6	0
Day 10	Negative	6	0
Day 11	Negative	11	0
Day 12	Negative	8	0
Day 13	Negative	8	0
Day 14	Negative	12	0
Day 15	Negative	5	0
Day 16	Negative	8	0
Day 17	Negative	22	0
Day 18	Negative	12	0

**Table 1 AerosolSense sample results and data from Sandwich Fire Department**

protocols were effective when used properly. This instilled confidence in the first responders that the Fire Department was a safe place to work now that they had a SARS-CoV-2 surveillance system in place.

“The solution provided validation that SARS-CoV-2 can be mitigated with mandated mask wearing and testing. The instrument also acted as a visual deterrent and encouraged employees to wear masks and follow the safety protocols.”

- Sandwich Fire Department Chief

The Fire Department has decided to continue to use the AerosolSense Sampler even after employee vaccination to further protect the employees in a semi-vaccinated community, especially in a co-habiting facility with many shared spaces.

**USA**  
27 Forge Parkway  
Franklin, MA 02038

Find out more at [thermofisher.com/aps](https://thermofisher.com/aps)

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