SUCCESS STORIES

A nursing home safeguards their residents with AerosolSense Sampler, an in-air pathogen surveillance solution

Situation

When it comes to SARS-CoV-2, few populations are as vulnerable as seniors; therefore, presenting a challenge to senior communities. Once the SARS-CoV-2 pathogen is identified in one of these environments, leadership must act quickly and confidently.

The leadership of Arbor Village Nursing Home in the Greater Tulsa metro area of Oklahoma faced the profound challenge of safeguarding seventy-one high-risk residents. They relied on rapid individual testing to diagnose COVID-19 cases. During the peak of the pandemic, employees and residents were routinely individually tested twice a week.

In partnership with Thermo Fisher Scientific, the Arbor Village Nursing Home had two goals:

1) Monitor for the presence of SARS-CoV-2 by sampling air in the employee break room as these individuals were in and out of the facility.

2) Correlate in-air sample results with rapid testing results to strengthen future decision making of rapid testing frequency.

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 Arbor Village Nursing Home to support their goals while helping to protect employees and residents.

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 the sample cartridge is removed and sent to a testing laboratory for results within twenty-four hours.

At the Arbor Village Nursing Home the AerosolSense Sampler was placed in the 100 sq. ft. employee breakroom. Air samples were collected each day, Monday through Friday, over a period of four weeks. After each sample cycle, samples were sent to a Thermo Fisher Scientific partner testing laboratory. The laboratory tested the air samples to identify the presence of SARS CoV-2 using the Applied Biosystems™ TaqPath™ COVID-19 Combo Kit, a highly sensitive multiplex diagnostic solution.

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Results

Over the four week period, sixteen out of twenty air sampling reports were negative and one was positive for SARS-CoV-2. See Table 1.

Figure 1 AerosolSense Sampler

Response

Following the in-air positive result, individual rapid testing was performed the same day, with all employees testing negative. An employee who worked overnight and accessed the breakroom while the sampler was running reported the following day that a family member tested positive for COVID-19. Prior to the positive in-air result and individual rapid test, the employee had not shown symptoms, but did quarantine at home for fourteen days.

Three days after the AerosolSense Sampler identified SARS-CoV-2, the employee who was quarantining at home tested positive with a rapid antigen test as they had begun to show symptoms. AerosolSense detected SARS-CoV-2 in the air of the facility before the individual tested positive for COVID-19. This employee was the only positive case during the timeframe of the program and it was the only time the sampler identified the presence of SARS-CoV-2 in the facility air.

Day	AerosolSense results	Average number of staff members in break room	Number of confirmed SARS-CoV-2 cases in the facility
Day 1	Negative		0
Day 2	Negative		0
Day 3	Inconclusive		0
Day 4	Positive		1 (rapid test)
Day 5	Negative		0
Day 6	Negative		0
Day 7	Negative		0
Day 8	Negative		0
Day 9	Negative		0
Day 10	Inconclusive		0
Day 11	Negative	~15-25 staff members per day	0
Day 12	Negative		0
Day 13	Inconclusive		0
Day 14	Negative		0
Day 15	Negative		0
Day 16	Negative		0
Day 17	Negative		0
Day 18	Negative		0
Day 19	Negative		0
Day 20	Negative		0

Table 1 AerosolSense sample results and data from Arbor Village Nursing Home

The employee who tested positive for COVID-19 was wearing a mask when around the sampler; however, they had removed it to eat and drink while in the breakroom. As the Executive Director stated:

"I was surprised that the sampler picked up the positive in the air because this employee would probably only take her mask off for a few minutes to drink or eat."

Conclusion

The Arbor Village Nursing Home achieved their goals of monitoring the break room air daily and correlating rapid testing data with in-air results. Combined with their existing routine testing and safety protocols, the AerosolSense Sampler identified the presence of SARS-CoV-2 early. This allowed leadership to make quick and more informed decisions; therefore, reducing the opportunity of an outbreak within the facility.

"The AerosolSense Sampler allowed for the identification of the virus in the air three days before an employee tested positive. This raised quick awareness to provide immediate testing to all employees and residents, which allowed us to prevent a potential outbreak. If the employee had not been put in isolation and we did not have the sampler, this could have resulted in an outbreak."

 - Arbor Village Nursing Home Executive Director

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