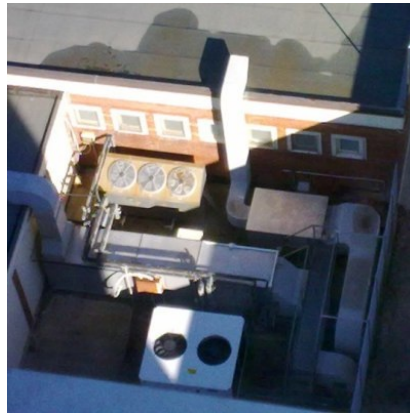




## Stability of COVID-19 and Treatment of Vented Air



COVID-19, the novel coronavirus is stable for a period from several hours to days in aerosols and on surfaces, especially on plastic and stainless steel. One suggested solution is using portable furnaces to sterilise contaminated building exhaust.

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According to the results of a new study from National Institutes of Health, CDC, UCLA and Princeton University scientists (van Doremalen N et al. 2020), the novel coronavirus can be detected in aerosols for up to 3 hours, on copper for up to 4 hours and on cardboard for up to 24 hours. For plastic and stainless steel the period can be as long as two-three days. These findings suggest the infection can spread through the air and by touching contaminated surfaces.

The researchers compared how the environment affects the coronaviruses causing COVID-19 disease and severe acute respiratory syndrome, or [SARS](#), identified in 2003 – SARS-CoV-2 and SARS-CoV-1 respectively. The latter infected over 8,000 people in 2002-2003 and is the human coronavirus most closely related to the former.

The researchers experimented with depositing the COVID-19 virus on surfaces in various settings through coughing or touching. The study showed that both coronaviruses were similarly viable. In an attempt to explain why SARS-CoV-2 is more contagious, the authors point to the evidence of transmission from asymptomatic carriers. They note that it was not the case with SARS-CoV-1, so similar disease control measures would be less efficient now. Another observation is the vulnerability of healthcare settings to the introduction and spread of the COVID-19 coronavirus, which is exacerbated by the stability of the virus on surfaces and in aerosols.

### A Possible Solution

A team led by [Hongxi Yin](#), the InCEES associate professor in advanced building systems and architectural design at Washington University (St. Louis, MI, USA) is looking into the possibilities to use portable furnaces for sterilisation of contaminated building exhaust in order to prevent airborne

infections (Otten 2020).

Built environments, such as airports or hospitals, often define and promote the disease outbreak. At temporary treatment facilities in Wuhan portable furnaces were used to burn medical waste and other potential sources of infection, but the air from there was simply vented outside without any direct treatment, as is the standard practice, according to Yin. The researcher, who is familiar with Wuhan's medical and architectural communities, questioned whether, in such a densely populated urban area as Wuhan, the sheer concentration of virus in building exhaust increased the spread of the virus.

Based on data about similar viruses (SARS, influenza, foot-and-mouth disease) Yin and his collaborators preliminary estimate that submitting exhaust to temperatures of 125°C for 3 seconds before release would deactivate 99.999% of COVID-19, though further study is needed on the mechanisms of COVID-19 transmission and susceptibility to heat.

In addition, this approach is commercially friendly – existing HVAC systems could be preserved with some adjustment, and the necessary equipment is available in the market. There are a number of logistics issues in terms of integrating the furnace system, but Yin hopes his research might be useful when designing temporary treatment centres for epidemics in future.

## References

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