

the top and sides, it doesn't matter that much, because slowing the momentum of any exhaled contaminants reduces the chance of any direct exchange of aerosols and droplets as the breath remains in the body's thermal plume and is carried upwards towards the ceiling. Additionally, masks stop larger droplets, and a three-layered mask decreases the amount of those contaminants that are recirculated through the room by ventilation."

The researchers found that laughing, in particular, creates a large disturbance, suggesting that if an infected person without a mask was laughing indoors, it would greatly increase the risk of transmission.

"Keep windows open and wear a mask appears to be the best advice," said Linden. "Clearly that's less of a problem in the summer months, but it's a cause for concern in the winter months."

The team are now working with the Department for Transport looking at the impacts of ventilation on aerosol transport in trains and with the Department for Education to assess risks in schools this coming winter.

For further reading

1. Rajesh K. Bhagat et al. 'Effects of ventilation on the indoor spread of COVID-19.' *Journal of Fluid Mechanics*, 2020, **903**, F1, DOI: 10.1017/jfm.2020.720.

Book Review

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The 180-page volume published in 2018 as open access by De Gruyter with title: **Microwave Based Weed Control and Soil Treatment** is authored by Graham Brodie, Dorin Gupta, Muhammad Jamal Khan, Sally Foletta, Natalie Bootes (DOI: <https://doi.org/10.1515/9783110605570>). This group of Australian authors have amassed in 14 chapters all the aspects and details concerning the application of microwave heating and wireless power transmission to plants and the soil.

To substitute herbicides and to overcome herbicide resistance, microwave treatments are proposed in a new technological approach for modern agricultural practices. With its absence of environmental and human health concerns, this novel microwave treatment of weed plants and soil is also compatible with no-till agricultural practices. It can substitute as a knock-down weed plant killer, or be applied to the soil as a pre-sowing soil fumigation treatment.

When the intensity of the microwave fields are moderate, different species of weed plants, which have already emerged, respond differently to microwave treatment. If the microwave field is intense enough, very rapid volumetric heating and some thermal runaway in the structures cause micro-steam explosions in the plant cells rupture the plant structures, which leads to death. These micro-steam explosions circumvent the normal temperature-time response of the plants and may lead to more efficient weed plant control.

Soil treatment requires significantly more energy; however, there are secondary benefits for crops growing in microwave treated soil. These include: significant reduction of the dormant weed seed bank; significant reduction of nematode populations; significant reduction of fungal populations; better availability of indigenous nitrogen for the plants; more rapid humification; and significant increases in crop growth and yield.

Additionally, microwave weed management and soil treatment is not restricted by weather conditions; therefore, the technology may offer some timeliness and environmental benefits, which are yet to be quantified in a cropping system.

