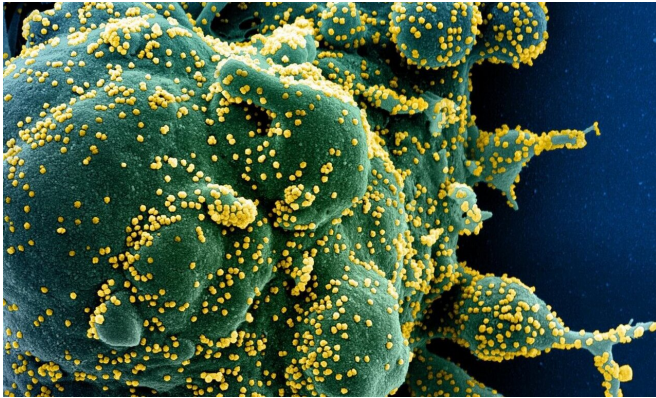


Investigation in meat processing plant suggests aerosol SARS-CoV-2 transmission in confined workspace

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Colorized scanning electron micrograph of an apoptotic cell (green) heavily infected with SARS-CoV-2 virus particles (yellow), isolated from a patient sample. Image captured at the NIAID Integrated Research Facility (IRF) in Fort Detrick, Maryland. Credit: NIH/NIAID

The importance of maintaining high quality air flow to restrict transmission of SARS-CoV-2 in confined workspaces has been strongly indicated by the investigation of an outbreak of the virus at a German meat processing plant during May and June 2020. The study, published in *EMBO Molecular Medicine*, found that the outbreak originated from a single worker on the meat processing production line. It also concluded that in such confined spaces where unfiltered air is recirculated at low rates of external air exchange, transmission of SARS-CoV-2 can occur over distances of at least eight meters.

The study is relevant for many workplaces, but especially significant for the meat and fish processing industries that emerged early during the pandemic as hotspots for SARS-CoV-2 around the world. A combination of environmental conditions and operational practices with close

proximity between many workers on production lines engaged in physically demanding tasks promoting heavy breathing, along with shared housing and transportation, all conspire to encourage [viral transmission](#) in such plants.

Melanie Brinkmann from Technische Universität Braunschweig and Helmholtz Centre for Infection Research, Germany, Nicole Fischer from University Medical Center Hamburg-Eppendorf, Hamburg, Germany and Adam Grundhoff from the Heinrich Pette Institute for Experimental Virology, Hamburg, Germany, together with a group of further researchers conducted a multifactorial investigation at Germany's largest meat processing plant in the state of North Rhine Westphalia, where the [outbreak](#) occurred. They traced the events starting with an initial outbreak in May, followed by increasing numbers culminating in more than 1,400 positive cases having been identified by health authorities by 23 June.

The investigation of timing of infection events, spatial relationship between workers, climate and ventilation conditions, sharing of housing and transport, and full-length SARS-CoV-2 genotypes, demonstrated that a single employee transmitted the virus to more than 60% of co-workers in a distance of eight meters.

Viral genome sequencing was conducted and showed that all the cases shared a common set of mutations representing a novel sub-branch in the SARS-CoV-2 C20 clade. Furthermore, the same set of mutations was identified in samples collected in the [time period](#) between the initial infection cluster in May and the subsequent large outbreak in June within the same factory, suggesting that the large outbreak was seeded by cases related to the initial infection cluster.

The results indicated that climate conditions, fresh air exchange rates, and airflow, were factors that can promote efficient spread of SARS-CoV-2 over long distances, but that shared accommodation and transport played a smaller role, at least during the initial phase of the outbreak. Earlier studies already suggested that tiny droplets called aerosols may be responsible for so-called super spreading events where a single source transmits the virus to a large number of individuals. Whereas larger droplets typically travel no farther than two meters, aerosols can stay in the air for prolonged periods of time and may deliver infectious viral particles over substantially greater distances, especially in indoor settings.

The recurrent emergence of such outbreaks suggests that employees in meat or fish processing facilities should be frequently and systematically screened to prevent future SARS-CoV-2 outbreaks. Furthermore, immediate action needs to be taken to quarantine all workers in a radius around an infected individual that may significantly exceed two meters.

Additional studies are required to determine the most important workplace parameters that may be altered to lower infection risk, but optimization of airflow and ventilation conditions are clearly indicated.

More information: Thomas Günther et al. SARS-CoV-2 outbreak investigation in a German meat processing plant, *EMBO Molecular Medicine* (2020). [DOI: 10.15252/emmm.202013296](https://doi.org/10.15252/emmm.202013296)

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