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SARS-CoV-2 outbreak in German meat processing plant: Transmissions took place over long distances in air-conditioned working area

Study on SARS-CoV-2 clusters in Germany's largest meat processing complex

In a joint study by the Heinrich-Pette-Institute, Leibniz Institute for Experimental Virology (HPI), the University Medical Center Hamburg-Eppendorf (UKE) and the Helmholtz Centre for Infection Research (HZI) the origins of the first SARS-CoV-2 outbreak in May 2020 at Tönnies in Rheda-Wiedenbrück, Germany's largest meat processing complex, were investigated. The study results have now been published on the preprint platform SSRN. A publication in a peer-reviewed journal will follow.

The results reconstruct the initial transmission events in May 2020 in a meat processing plant: starting with a single employee, the virus was transmitted to other people within a radius of more than eight meters. The main transmission took place in the processing area of the plant, where air is continuously circulated and cooled to ten degrees Celsius. In contrast, housing in shared apartments did not play a significant role during the investigated phase of the outbreak.

In addition, an analysis of the virus sequences shows that in May 2020, all persons from the infection cluster tested positive for SARS-CoV-2, share a set of eight mutations previously not observed. The same combination of mutations was also detected in samples from the period between the initial infection cluster and the subsequent, much larger outbreak in June 2020 in the same meat processing plant - an observation that suggests a continuous outbreak situation.

"Our results indicate that the conditions of the processing plant - namely the low temperature, low fresh air supply and constant air circulation through the air-conditioning system in the hall, together with hard physical work - promoted the aerosol transfer of SARS-CoV-2 particles over greater distances. It is very likely that these factors in general play a significant role in the globally occurring outbreaks in meat or fish processing plants. Under these conditions, a distance of 1.5 to 3 meters alone is obviously not sufficient to prevent transmission", explains Prof. Adam Grundhoff, co-author of the study and research group leader at the HPI.

"Our study sheds light on SARS-CoV-2 infections in a workspace where various factors come together that allow transmission over relatively long distances. It is now the important question under which conditions transmission events over longer distances are possible in other areas of life", says Melanie Brinkmann, professor at the Technical University of Braunschweig and research group leader at the HZI.

The results were published on the preprint platform "SSRN":

Thomas Günther, Manja Czech-Sioli, Daniela Indenbirken, Alexis Robitailles, Peter Tenhaken, Martin Exner, Matthias Ottinger, Nicole Fischer, Adam Grundhoff, Melanie M. Brinkmann (2020). *Investigation of a superspreading event preceding the largest meat processing plant-related SARS-Coronavirus 2 outbreak in Germany*. SSRN. <https://ssrn.com/abstract=3654517> (Preprint)

Media Contact

Dr. Franziska Ahnert, HPI

Phone: 040/48051-108

Fax: 040/48051-103

presse@leibniz-hpi.de

Susanne Thiele, HZI

Phone: 0531/6181-1400

Fax: 0531/6181-1499

susanne.thiele@helmholtz-hzi.de

Contact

Prof. Adam Grundhoff, HPI

Phone: 040/48051-275

adam.grundhoff@leibniz-hpi.de

Prof. Melanie M.

Brinkmann, HZI & TU Braunschweig

Phone: 0531/6181-3069

melanie.brinkmann@helmholtz-hzi.de

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Contact:

Prof. Adam Grundhoff:

adam.grundhoff@leibniz-hpi.de

Heinrich Pette Institute, Leibniz Institute for Experimental Virology,
Hamburg

Prof. Melanie M. Brinkmann

melanie.brinkmann@helmholtz-hzi.de

Helmholtz Centre for Infection Research & Technische Universität Braunschweig

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Heinrich Pette Institute, Leibniz Institute for Experimental Virology

The Heinrich Pette Institute, Leibniz Institute for Experimental Virology (HPI) investigates the biology of human pathogenic viruses with the aim of unraveling the molecular mechanisms that control viral life cycles and virus induced pathogenesis. The institute applies basic experimental research to develop new approaches for contemporary treatments of viral infections such as AIDS, influenza and hepatitis but also of emerging viral diseases.

The HPI was established by the philanthropist Philipp F. Reemtsma and the neurologist Heinrich Pette in 1948. The institute is a non-profit, independent research foundation that is part of the Leibniz Association.

The HPI is a member of DZIF, the German Center for Infection Research.

Further information: www.hpi-hamburg.de

Helmholtz Centre for Infection Research:

Scientists at the Helmholtz Centre for Infection Research (HZI) are investigating the mechanisms of infections and their defences. Understanding what turns bacteria or viruses into pathogens is the key to developing new drugs and vaccines.

The HZI is a member of DZIF, the German Center for Infection Research.

Further information: www.helmholtz-hzi.de