

Pertussis more common in Europe than previously thought

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Gram stain of the bacteria *Bordetella pertussis*. Credit: CDC

Although vaccination programs against pertussis are effective in Europe, a new Finnish study shows that the disease is still very common among middle-aged adults in various European countries. At the same time, the results show that the disease is underdiagnosed as the annually reported figures are considerably lower than those discovered in the study.

The primary cause of pertussis, also known as whooping cough, is the *Bordetella pertussis* agent that spreads through the respiratory mucosa and produces toxins that damage the mucous membrane. These toxins incapacitate the body's defense mechanisms and the infection is marked by severe, spasmodic coughing episodes. Pertussis is often categorized as a childhood disease, but adults can also contract it.

Before vaccination programs, whooping cough was one of the deadliest childhood diseases. In Finland, vaccinations started in 1952, and the pertussis vaccination is included in the national DTP vaccination program. Even though the vaccination programs are effective in Europe, the number of pertussis cases has increased in several countries. Around 200–500 whooping cough cases are reported in Finland each year, while globally, there were over 150,000 reported cases in 2018.

The University of Turku in Finland leads an extensive European follow-up study on pertussis, diphtheria and tetanus. The study is part of the EUPert-LabNet laboratory network funded by the European Center for Disease Prevention and Control (ECDC). The EUPert-LabNet network is led by the head of the Finnish National Reference Laboratory for Pertussis and Diphtheria, Professor Qiushui He from the University of Turku. Eighteen European countries have participated in the study.

"To our best knowledge, this is the largest follow-up study in Europe since the DTP vaccines were introduced. On the basis of the results, whooping cough seems to be more common in Europe than previously thought. The [disease](#) was most common in Norway, France and Denmark, and most uncommon in Finland and Hungary," says Professor He. "A very alarming finding in our research was the low levels of antibodies against diphtheria in many European countries. This clearly indicates that the herd immunity in middle-aged adults is decreasing. Attention should be paid to this matter across Europe. On the other hand, antibodies against tetanus are on a sufficient level in different European countries."

The pertussis research team works at the Institute of Biomedicine of the University of Turku, and is co- led by Professor h.c., Docent Jussi Mertsola. Since 2005, Professors He and Mertsola have coordinated the European EUpertstrain network that studies how changes in [pertussis](#) strains

impact the effectiveness of the vaccines.

The Turku Pertussis Team led by He and Mertsola is currently investigating immune responses in children and adults including how immunisations during pregnancy affect the immunity of newborn babies. The studies are part of the five-year European PERISCOPE project with €28 million funding from the EU's IMI2 and Horizon 2020 programs.

The research article was published in *Nature Communications*.

More information: Berbers, G. et al, Circulation of pertussis and poor protection against diphtheria among middle-aged adults in 18 European countries, *Nature Communications* (2021). [DOI: 10.1038/s41467-021-23114-y](https://doi.org/10.1038/s41467-021-23114-y)

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