# Immunity gap likely reason for cluster of New Zealand whooping cough deaths, experts say

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The death of three babies in Aotearoa from whooping cough this year were likely caused by an infant-mother immunity gap, according to a

group of infectious disease and immunization experts.

The collaborative research comment, published in *The Lancet Regional Health—Western Pacific*, focuses on the death of three babies, aged between four and eight weeks old, in the North Island in February and March 2023.

Lead author Professor Peter McIntyre, of the University of Otago's Department of Women's and Children's Health, says the "most plausible explanation" for the cluster of deaths is a maternal-infant immunity gap, due to three factors.

"Physical distancing and border closures due to COVID-19 significantly reduced exposure to pathogens spread by the respiratory route—on the upside that reduced infections, but the downside is that circulation of infections in the community, many of which did not cause symptoms, helps maintain population immunity and that has been missing," he says.

"Unfortunately, despite being fully funded since 2013, uptake of maternal whooping cough vaccination in pregnancy among those living in areas of high deprivation, particularly Māori and Pacific women, sits at between 20 and 30% and is also too low generally, with a maximum of only 60%.

"To add to the immunity gap this creates among newborns born to immunized mothers, New Zealand has long-standing poor timeliness for the whooping cough vaccine doses at ages 6, 12 and 20 weeks—especially in areas of high deprivation. The timeliness of these immunizations deteriorated further during 2022."

These three factors could lead to a complete absence of protective antibodies in an increased proportion of mothers, and complete absence is in turn the main risk factor for fatal whooping cough in newborn

infants, Professor McIntyre says.

Whooping cough has been a notifiable disease in Aotearoa since 1996, with four to five year peaks. After an epidemic beginning in October 2017, all-age notifications decreased to 1,206 in 2019, followed by record lows of 171 (2020), 41 (2021) and 18 (2022). In 2023, 33 cases were notified by 17 June.

Infant hospitalizations represented 3–6% of total notifications between 2018 and 2020 and none in 2021 and 2022, but by the middle of June this year had reached 11 (33%).

"The cluster of three whooping cough deaths this year was tragic in so many ways—even if no more deaths occurred during 2023, this translated to a five-fold increase in whooping cough deaths compared with any previous year in Aotearoa. In relative terms this is double the number of infant whooping cough deaths which triggered a national emergency in England in 2012."

Co-author Dr. Owen Sinclair chairs the independent New Zealand Immunization Taskforce which in April this year recommended a range of measures to improve access to and uptake of infant and maternal vaccines, with a focus on service provision to the most underserved groups.

"Reaching as many pregnant women as possible so they have whooping cough vaccine during pregnancy is the only way to protect babies too young to receive even the first dose at age six weeks," Dr. Sinclair says.

**More information:** Peter B. McIntyre et al, Pertussis deaths in New Zealand without community transmission—an infant immunity gap?, *The Lancet Regional Health—Western Pacific* (2023). DOI: 10.1016/j.lanwpc.2023.100850

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