New study reinforces timely need for pneumococcal vaccine switch

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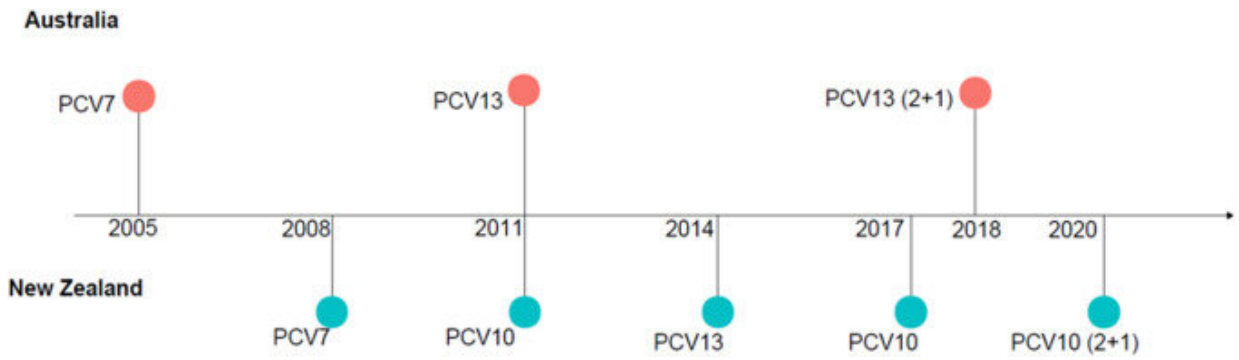

Important changes in universal immunization schedules for children in Australia and New Zealand from 2005 to 2020. Australia: children with high-risk medical conditions and Indigenous children in high-incidence jurisdictions (Northern Territory, South Australia, Queensland, Western Australia): PCV13 in 3 primary doses + 1 booster schedule (3p + 1) and PPV23 at 4 years and 5 years. New Zealand: For children with high-risk medical conditions PCV13 in 3p + 1 schedule and 23PPV at 2 years and 7 years. PCV, pneumococcal conjugate vaccine; PPV, pneumococcal polysaccharide vaccine. Credit: *The Lancet Regional Health - Western Pacific* (2023). DOI: 10.1016/j.lanwpc.2023.100764

New research from the University of Otago, Christchurch, backs a recent Pharmac decision to provide broader protection against a potentially fatal childhood disease.

Late last year, in response to concerns raised by child health experts,

Pharmac amended the national childhood immunization schedule to include a 13-valent pneumococcal vaccine (PVC-13) in response to rising case numbers of Invasive Pneumococcal Disease (IPD).

Now, a study comparing IPD incidence rates between Australia and Aotearoa New Zealand backs Pharmac's decision to upgrade the vaccine from the existing 10-valent to a 13-valent vaccine.

The study, published in *The Lancet Regional Health—Western Pacific* journal, compared IPD case numbers in both countries over a five-year period from 2017 to 2021.

It concludes that while the Indigenous Australian population experienced the highest rates of the disease (followed by Pasifika and New Zealand Māori), the overall IPD rate in Aotearoa for pre-school children increased during this time period, particularly cases of the potentially life-threatening 19A IPD serotype.

While ethnicity-adjusted IPD rates for children under two were similar for both countries between 2017 and 2020, case numbers in New Zealand rose sharply in 2021.The crude rate of IPD in NZ children under 2 years of age was found to be more than three times higher than in Australia, with 64.3% of isolates identified as serotype 19A. New Zealand's proportion of serotype 19A IPD cases increased from 11.5% to 29.5% for children under 5 years old, whereas Australian rates remained static at 5%.

Study co-author Professor Tony Walls, Pediatric Infectious Diseases Specialist at the University of Otago, Christchurch, says the results reinforce the timeliness of Pharmac's decision to switch to the PVC-13 vaccine.

"The World Health Organization recommends that a switch in the

vaccine used in any national PCV program should be considered if the epidemiology of IPD changes significantly. This study, the first undertaken comparing IPD rates in both countries, proves that significant change was occurring in New Zealand, and that an upgrade to the PVC-13 vaccine was urgently required," says Professor Walls.

"Pneumococcal disease is currently the world's number one vaccine-preventable cause of death among infants and children younger than five years of age. This decision will help arrest the concerning rise in IPD case numbers in this country and better protect our young children from the worrying and life-threatening risks the disease poses."

Australia's national immunization schedule has funded a PVC13 vaccine since 2011. However, while New Zealand's immunization schedule included a PVC13 vaccine from 2014 to 2017, it had reverted to a 10-valent pneumococcal vaccine (PVC10) in 2017, due to low IPD case numbers at the time, and in order to re-direct funding into other vaccines.

Pneumococcal disease is caused by the common bacteria Streptococcus pneumoniae. At the more minor end, it can cause localized ear or sinus infections. But IPD occurs if the bacteria get into the blood, resulting in a severe form of pneumonia, bacteremia (blood infection) and meningitis, potentially affecting the heart muscle, joints and abdomen. In 2022 there were 41 deaths due to IPD in New Zealand. Also of concern, treatment can be compromised due to rising rates of antibiotic resistance.

Study co-author, University of Otago, Christchurch Post-doctoral Research Fellow Nienke Hagedoorn, says young Pasifika and Māori children in Aotearoa are disproportionally affected, as are other vulnerable groups.

"The risk of invasive pneumococcal disease for Pasifika children and tamariki Māori is almost three times higher than the risk for other ethnicities in New Zealand. However, our study shows rates of serotype 19A are also increasing among New Zealanders aged over 65 as well," says Hagedoorn.

"It's important for surveillance to also monitor serotype and IPD incidence in older New Zealanders to inform ongoing policy on pneumococcal vaccines. Their burden of disease should also be considered as the influence of infant vaccinations can also provide indirect immunity in older age groups."

Professor Walls warns the recent switch from PVC10 to PVC13 may take a few years to significantly reduce our burden of disease.

"Catch-up immunizations for children under five are not part of the PVC program change, therefore those who received PVC10 may not have adequate protection against serotype 19A," he says.

The study authors say improving immunization coverage nationwide, particularly in high-risk groups, should be a key aspect of any plan to reduce the impact of IPD due to stereotype 19A.

More information: Nienke N. Hagedoorn et al, Comparison of the epidemiology of invasive pneumococcal disease between Australia and New Zealand in 2017–2021: an observational study based on surveillance data, *The Lancet Regional Health—Western Pacific* (2023). DOI: 10.1016/j.lanwpc.2023.100764

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