

Recent contact with young children linked to over 60s risk of acquiring pneumonia-causing bacteria

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New research being presented at this year's European Congress of Clinical Microbiology and Infectious Diseases ([ECCMID 2024](#)) in

Barcelona, Spain (27-30 April) finds that pneumonia-causing bacteria are common in the over 60s and that contact with pre-school and young school-aged children appears to be the most important factor in the onward transmission of *Streptococcus pneumoniae* (pneumococcus) to the over 60s.

Pneumococcus is the main bacterial pathogen involved in ear and sinus infection, but is also a major cause of more severe diseases such as pneumonia, sepsis, and meningitis. Pneumococcal infections mainly affect children under two and the elderly, and claim almost two million lives worldwide every year.

The US CDC estimates that pneumococci cause more than half of all cases of bacterial meningitis in the U.S. with around 2,000 cases of pneumococcal meningitis occurring each year. Over 150,000 hospitalizations from pneumococcal pneumonia occur every year in the U.S., and pneumococci is also the most common bacterial cause of childhood pneumonia, especially in children under 5 years. In adults, pneumococci account for 10% to 30% of adult community-acquired pneumonia.

Since pneumococcal conjugate vaccines (PCV) were included in America's childhood vaccination program in 2000, invasive disease caused by vaccine-type strains in children has decreased by over 90%, an effect that has not been seen in older adults. This suggests that pneumococci might be transmitted by age groups other than children.

Pneumococci commonly inhabit the respiratory tract of healthy persons and are transmitted via respiratory droplets. Rates of asymptomatic carriage vary—the CDC estimates that among [school-age children](#), 20% to 60% may be colonized, while only 5% to 10% of adults without children are colonized.

Important questions remain about the sources of transmission of pneumococcus to older adults in the community. This information is vital for understanding the potential indirect effects of using PCVs in children and older adults.

"If substantial pneumococcal transmission occurs between adults, then vaccination of older adults could have the additional benefit of reducing transmission and potentially serious disease," explains lead author Dr. Anne Wyllie from the Yale School of Public Health, New Haven, U.S..

To find out more about the importance of within-household transmission between adults aged 60 and older, and the risks associated with acquiring pneumococcus in the community, researchers conducted a [longitudinal study](#) in New Haven, Connecticut of household pairs (e.g. married couples) aged 60 and older without younger individuals living in the household.

Over the course of autumn/winter 2020/2021 and 2021/2022, a total of 183 adults (average age 70 years; 51% female; 85% White) living in 93 households were enrolled.

Researchers collected saliva samples and data from questionnaires about social behaviors and health from participants every 2 weeks over six visits (over a period of 10 weeks).

Quantitative PCR (qPCR) was used to test [saliva samples](#) for the presence of pneumococcal DNA and the diversity of pneumococcal strains. Usually, testing for pneumococcus in adults is assessed using nasopharyngeal swabs—taken from far back inside the nostril. Previous work by the same author established that this is insufficient to capture carriage in adults so sampling saliva is more effective at detecting pneumococcus in adults.

The analyses found that overall, 52/1,088 (4.8%) samples tested positive for pneumococcus, with 28/183 (15%) individuals colonized on at least one sampling visit.

Several individuals tested positive for pneumococcus at multiple timepoints including two participants who were colonized throughout the 10-week sampling period. Two other adults tested positive at five of the six time points—one of whom reported daily contact with children aged 2-59 months and 5-9 years.

In 5/93 (5.4%) households, both members were carriers, though not necessarily at the same time point.

Pneumococcal carriage point prevalence (at any sampled time) was substantially (six times) higher among older adults who had contact with children daily/every few days (10%) compared to those who had no contact with children (1.6%).

For those participants who reported recent contact (within 2 weeks of sample collection): point prevalence was highest in those in contact with younger children, with those who reported recent contact with younger children, with those who reported recent contact with younger children. While the numbers were small, those who had contact with children daily or every few days had the highest prevalence (15.7% and 14.0%, respectively). Those who had contact once or twice a month or no contact had lower prevalence (4.5% and 1.8% respectively).

Recent (within 2 weeks of sample) contact with children aged under 10 years was associated with a significant (3-times) increase in acquisition rate compared with no contact. Likewise, those over-60s with contact with children daily or every few days had a 6-times higher risk of acquisition than those without contact with children.

"Our study found no clear evidence of adult-to-adult transmission even

though there were households in which an individual was positive for pneumococcus across numerous sampling moments, and instances where both adults in the household carried pneumococcus around the same time," says Dr. Wyllie.

"Instead, we found that transmission was highest among older adults who had frequent contact with young children. This suggests that the main benefit of adult pneumococcal vaccination is to directly protect [older adults](#) who are exposed to children who may still carry and transmit some vaccine-type pneumococcal strains despite successful national childhood vaccination programs."

The authors note that the study period coincided with the COVID-19 pandemic, so they were able to explore risk factors for pneumococcal carriage when strict transmission mitigation measures were in place and eased over time. Interestingly, carriage rates remained consistent across both study seasons, despite a return to community activities in the second season and an increased circulation of respiratory viruses in the local community.

The authors note that the findings are based on a small community-based study (with comparatively few carriers detected) in one region of the U.S. involving mostly White individuals with higher education which might limit the generalizability of the findings to people from other racial or ethnic groups and countries. They also note that while saliva is generally more sensitive for the detection of pneumococcal carriage in adults, it is still possible that the overall carriage prevalence may have been underestimated since they did not sample other sites in the upper airway.

The research is [available](#) on the *medRxiv* preprint server.

More information: Anne L. Wyllie et al, Contact with young children

is a major risk factor for pneumococcal colonization in older adults, *medRxiv* (2024). DOI: [10.1101/2024.01.03.24300789](https://doi.org/10.1101/2024.01.03.24300789)

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