Respiratory disease in early childhood linked to higher risk of death in adulthood

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Contracting a lower respiratory tract infection in early childhood is associated with a higher risk of dying from respiratory disease as an

adult, according to new research.

A study, led by researchers from Imperial College London and published in *The Lancet*, has found that children who had had a lower respiratory tract infection (LRTI)—such as bronchitis or pneumonia—by age 2 were almost twice as likely to die prematurely in adulthood from respiratory diseases. The research showed the rate of premature death from respiratory disease was about 2% for those who had a LRTI in early childhood, compared to around 1% for those who did not. The findings remained after adjusting for socioeconomic factors and smoking status.

Chronic respiratory diseases are a major public health problem, accounting for an estimated 3.9 million deaths, or 7 percent of all deaths worldwide, in 2017. Most of these deaths were caused by chronic obstructive pulmonary disease (COPD)—a group of lung conditions that cause breathing difficulties, such as emphysema and chronic bronchitis.

Previous research has linked infant LRTIs to the development of adult lung function impairments, asthma, and COPD, but it has been unclear if there is also a link to premature death in adulthood. This first-of-its-kind study spans more than 73 years and provides the best evidence to date that early respiratory health has an impact on mortality later in life.

The findings challenge the misconception that adult deaths from respiratory diseases are determined only by behavior in adulthood, such as smoking. The researchers say that this highlights the need to prevent childhood respiratory infection and improve the health of children, through targeted public health measures and health service interventions, such as vaccination, improving living conditions, and better diagnosis and treatment of underlying health conditions.

The study was carried out in collaboration with researchers from University College London, Loughborough University, and Royal

Brompton and Harefield NHS Foundation Trust (now part of Guy's and St Thomas' NHS Foundation Trust).

Dr. James Allinson, lead author for the study, from the National Heart & Lung Institute at Imperial College London, said, "Current preventative measures for adult respiratory disease mainly focus on adult lifestyle risk factors such as smoking. Linking one in five adult respiratory deaths to common infections many decades earlier in childhood shows the need to target risk well before adulthood.

"To prevent the perpetuation of existing adult health inequalities, we need to optimize childhood health, not least by tackling childhood poverty. Evidence suggesting the early life origins of adult chronic diseases also helps challenge the stigma that all deaths from diseases such as COPD are related to lifestyle factors."

Professor Rebecca Hardy, co-author for the study, from University College London and Loughborough University, noted, "The results of our study suggest that efforts to reduce childhood respiratory infections could have an impact on tackling premature mortality from respiratory disease later in life. We hope that this study will help guide the strategies of international health organizations in tackling this issue."

The study uses data from a nationwide British cohort study called The National Survey of Health and Development (NSHD), which recruited individuals at birth in 1946, to look at health and death records for 3,589 people up until 2019. Of the 3,589 study participants, 913 suffered a lower respiratory infection before age 2.

Professor Nish Chaturvedi, co-author for the study and PI of NSHD, from University College London, said, "This study highlights the importance of whole of life studies. As the UK's longest running nationally representative cohort study—the MRC NSHD, 1946 British

Birth Cohort, is uniquely placed to investigate early life factors that can lead to premature mortality from respiratory disease in later life."

As the results show the childhood origins of health inequalities among adults who were born in the 1940s, improvements in childhood health and healthcare since this time may have led to better outcomes for children born today. However, evidence of the potentially lifelong consequences of poor childhood health highlights the need for renewed efforts to prevent LRTIs among children.

The researchers used a statistical model to estimate the association between a respiratory infection in early childhood and premature death from respiratory diseases in adulthood, while adjusting for different factors that can influence risk.

Analysis adjusting for socioeconomic background during childhood and smoking status suggested that children who had a LRTI by the age of two were 93% more likely to die prematurely from respiratory disease as adults, compared to children who had not had a LRTI by age two. This equated to a 2.1% rate of premature adult death from respiratory disease among those who had a LRTI in early childhood, compared to 1.1% among those who did not report a LRTI before the age of two.

The researchers say this increased risk potentially accounts for 179,188 premature deaths in England and Wales between 1972 and 2019, or one in five deaths from respiratory disease.

In comparison, adult respiratory deaths linked to smoking account for three in five deaths from respiratory disease, or 507,223 excess deaths in England and Wales over the same period.

The researchers note that despite their adjustments, there may have been other risk factors which were unreported, such as parental smoking and

being born prematurely. They also note that societal changes during the life-spanning study may have driven changes in lung function of subsequent cohorts and altered outcomes.

More information: Early childhood lower respiratory tract infection and premature adult death from respiratory disease in Great Britain: a national birth cohort study, *The Lancet* (2023). www.thelancet.com/journals/lan … (23)00131-9/fulltext

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