



Factsheet Respiratory Syncytial Virus PIENTER 3 study results

Background

Respiratory syncytial virus (RSV) is known for causing a spectrum of infections ranging from mild to severe infections, particularly affecting infants and the elderly, especially in low-income countries. This investigation explored RSV-specific antibody concentrations across various age groups, focusing on infants younger than two years and those with chronic obstructive pulmonary disease (COPD). The research aimed to shed light on the immune response against RSV throughout life and its implications for infection risk.

Results

Using serum samples from two cross-sectional Dutch studies (PIENTER 2 and 3) encompassing a wide age range, with an oversampled representation of infants under two years, the research revealed several key insights. Maternal IgG antibodies against specific RSV proteins diminished within the first year of life (figure 1), and infants got infected for the first time and started producing their own antibodies around 3-6 months of age. Since IgA isn't transferred via the placenta to the unborn child, the use of IgA seroconversion helped differentiate between infants with maternal IgG and those with endogenous IgG produced after an infection with RSV (figure 2). By age 3, practically all Dutch children had encountered RSV. Antibody concentrations plateaued between 5-9 years and remained constant thereafter, with a slight (but significant) gradual rise from 50 to 90 years. This pattern was consistent across different RSV proteins. COPD patients exhibited comparable RSV-specific IgG levels and antibody avidity to healthy individuals. The analysis also unveiled age, birthdate, day-care attendance, and young siblings as significant RSV infection risk factors. Children born in summer had heightened infection chances.

Figure 1. Scatterplots and geometric mean concentrations (GMCs; horizontal bars) of serum immunoglobulin G (IgG) concentrations (AU/mL) against prefusion F for different age groups. A, Green circles represent samples from the 2006–2007 Pienter2 study and (B) blue circles samples from the 2016–2017 Pienter3 study. Cord blood (CB) sera are represented by red circles. C, GMCs (continuous lines) and 95% confidence intervals (dotted lines) for both studies.

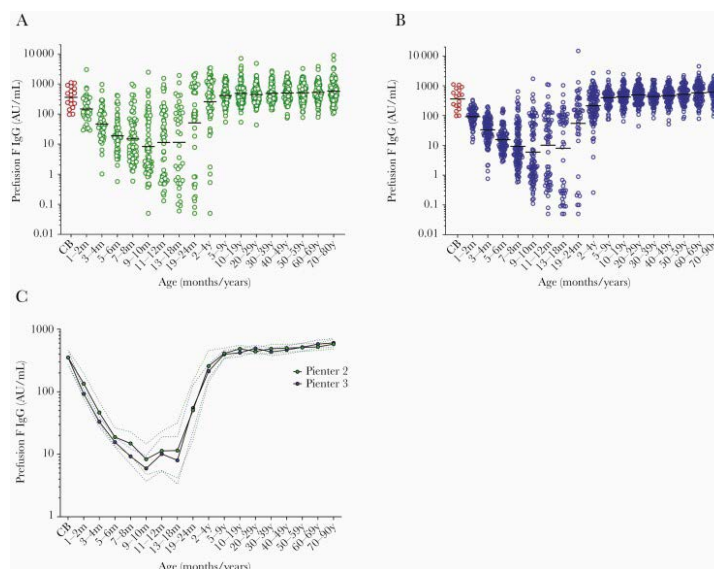
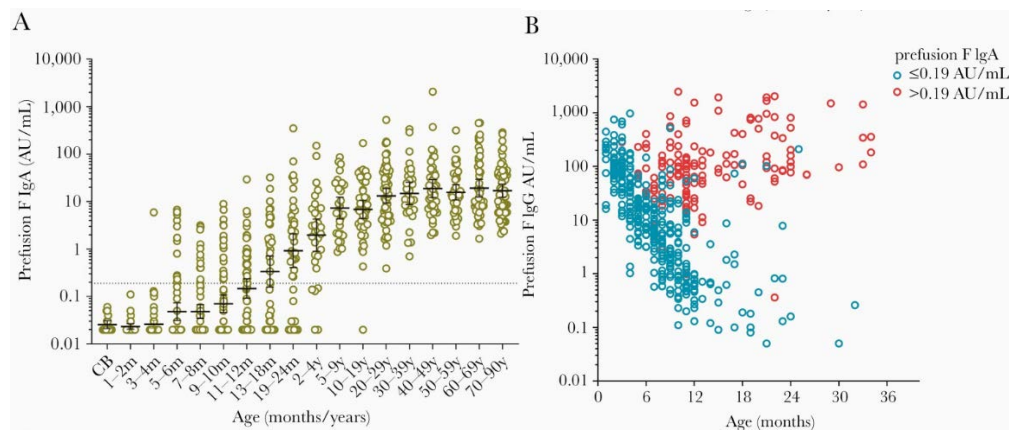


Figure 2. A, Scatterplots and geometric mean concentrations with 95% confidence intervals (horizontal bars) of serum immunoglobulin A (IgA) concentrations (AU/mL) against prefusion F are shown for all age groups. An estimated arbitrary IgA cutoff for seropositivity of 0.19 AU/mL is represented by the dotted line. B, Serum IgG concentrations (AU/mL) against prefusion F from children up to 3 years of age where red circles represent IgG concentrations of sera with an IgA concentration > 0.19 AU/mL and blue circles represent sera with an IgA concentration \leq 0.19 AU/mL.



Conclusion/discussion

The study's findings hold significance in estimating immunity acquisition against RSV and identifying risk factors and vulnerable groups for infection. The presence of IgA antibodies emerged as a potential marker for RSV infection in infants under 1 year old. Although local IgA antibodies might wane, leading to frequent reinfections in adults, their protective role remains complex. Despite RSV's link to COPD exacerbations, no substantial differences in antibody levels and quality were observed between COPD patients and healthy subjects. In essence, the research provides a comprehensive understanding of RSV-specific antibody dynamics, contributing to the knowledge base to shape effective intervention strategies and underscoring the importance of lifelong immunity assessment.

Publication

- [Antibody Responses to Respiratory Syncytial Virus: A Cross-Sectional Serosurveillance Study in the Dutch Population Focusing on Infants Younger Than 2 Years.](#)
Berbers G, Mollema L, van der Klis F, den Hartog G, Schepp R.
The Journal of Infectious Diseases 2021; 224(2):269-278.
- [Population-based serology reveals risk factors for RSV infection in children younger than 5 years.](#)
Andeweg SP, Schepp RM, van de Kasstele J, Mollema L, Berbers GAM, van Boven M.
Scientific Reports 2021; 11(1):8953.