Transplacental transfer of RSV antibody in Australian Aboriginal infants

Nusrat Homaira1, Michael Binks2*, Natasha Larter3, Katrina Clark4, Megan Campbell5, Lisa McHugh6, Nancy Briggs1, Kristine Macartney4, Joyce Nyiro7, Sacha Stelzer-Braid8, Gregory Walker8, Tom Snelling8, Saad Omer10, William Rawlinson8, Ross Andrews11, Adam Jaffe1

*Joint primary authors

1 UNSW, Sydney, Australia, 2 Menzies School of Health Research, Darwin, Northern territory, Australia, 3 Sydney Children’s Hospitals Network, Sydney, 4 National Centre for Immunisation Research and Surveillance (NCIRS), 5 Centre for Aboriginal Health, New South Wales Health, Australia, 6 Menzies School of Health Research, Brisbane, 7 KEMRI-Wellcome Trust Research Programme, Kenya, 8 Prince of Wales hospital, Sydney, Australia, 9 University of Sydney, Sydney, Australia, 10 Yale University, USA, 11 Australian National University, Canberra, Australia

Background:

- Acute lower respiratory infections (ALRIs) account for 31% of all hospitalisations in Australian Aboriginal infants.
- Respiratory syncytial virus (RSV) is the leading cause of ALRI hospitalisations in Aboriginal infants specifically those aged<6 months.
- The rate of RSV-associated hospitalisation double in Aboriginal compared to non-Aboriginal infants.
- Maternally derived anti-RSV antibody (Ab) can protect against severe RSV disease in infancy. However, the efficiency of transplacental transfer of maternal anti-RSV Ab remains unknown in Australian Aboriginal infants.

Methods:

- As a secondary outcome of a maternal pneumococcal vaccine trial among an Australian Aboriginal and/or Torres Strait Islander population, paired maternal and infant cord blood samples collected at birth analysed for anti-RSV Ab titres using a neutralization assay.
- Impact of covariates including low birth weight, infants' weight at birth (>3kg), gestational age, sex of the baby, maternal age (>25 years) and multiparity of the mother on cord to maternal anti-RSV Ab titre ratio (CMTR) investigated using multivariable logistic regression model.
- A CMTR of ≥ 1 considered efficient transfer

Results:

- Serum samples available from 78 mother-infant pairs.
- 78 infants born full term (median gestational age 39 weeks, IQR 38-40 weeks); 56% males.
- Mean log2 anti-RSV Ab level in maternal blood at delivery 10.7 SD ± 1.3 and in infant cord blood 11.0 SD ± 1.3.
- Mean CMTR 1.02 (SD ±0.06).
- Almost one-third (22/78) mother-infant pairs had CMTR <1.
- Maternal and infant cord blood Ab titres at birth correlated (R=0.87).
- Cord blood log2 anti-RSV Ab <11.0 in 48% of the infants (38/78).
- Covariates showed no effect on CMTR.

Conclusion:

To our knowledge this is the first study examining the transfer of anti-RSV Ab in Australian Aboriginal mother-infant pairs. One third of infants had suboptimal antibody transfer efficiency. Further research is needed to examine the clinical significance of transplacental transfer of anti-RSV Ab on severe RSV disease in Australian Aboriginal infants.