KK Women's and Children's Hospital
SingHealth

LB-RES-043

Seroprevalence of variant specific neutralizing antibodies and COVID-19 hospitalization

Yung CF[1 2 3],Lau N[1], Yeo XLR[4], Khew XF[4], Mah SYY[5], Tan QL[1], Thio ST[1], Wang LF[5], Tan KB[6], Lam JCM[4]

[1]Infectious Disease Service, Department of Paediatrics, KK Women's and Children's Hospital, Singapore [2]Duke-National University of Singapore Medical School, Singapore [3]Lee Kong Chian School of Medicine, Nanyang Technological University, Singapore [4]Dept of Microbiology and Pathology, KK Women's and Children's Hospital, Singapore
[5]Programme in Emerging Infectious Diseases, Duke-NUS Medical School, Singapore [6]PREPARE Programme, Ministry of Health, Singapore

Background

Routine surveillance methods based on notification of cases underestimates true population disease burden and virus transmission. Seroprevalence studies can provide better estimates of population immunity levels and epidemic risk, which are crucial for public health responses during a pandemic.

We investigated the association of SARS-CoV-2 variant specific seroprevalence in children and population-wide COVID-19 hospitalization surges due to emergence of XBB, JN.1, EG.5 variants.

Method

Every six months beginning from March 2023, approximately 700 residual blood samples from children aged 6 months to 18 years old were collected from a public specialist paediatric hospital in Singapore. Samples were tested for neutralizing antibodies using a multiplex surrogate-virus neutralizing (sVNT) assay (C-Pass GenScript sVNT).

Linear trends of neutralizing antibody seroprevalence (SARS-CoV-1, SARS-CoV-2 and EG.5) were compared to population-wide COVID-19 hospitalization rates and predominant novel SARS-CoV-2 variants in circulation.

Results

There was a downward trend of SARS-CoV-1, SARS-CoV-2 and EG.5 specific neutralizing antibody levels in the paediatric population prior to the surge in population-wide COVID-19 hospitalizations attributable to XBB, EG.5 and JN.1 variants (Figure 1A, B, D).

The third batch sampling coincided with the peak of the second EG.5 epidemic. The increase in hospitalizations due to this epidemic was also accurately reflected in the rise in seroprevalence of SARS-CoV-1, SARS-CoV-2 and EG.5 specific neutralizing antibody levels in the paediatric population (Figure 1C).

Linear trends of SARS-CoV-1 specific neutralizing antibody seroprevalence consistently had the highest r^2 (>0.6) for all three novel SARS-CoV-2 variant epidemics.

Conclusion

There was a correlation between population immunity levels derived from residual samples of children from a paediatric hospital with overall COVID-19 hospitalization due to XBB, EG.5 and JN.1 epidemics.

Seroprevalence of paediatric population SARS-CoV-1 specific neutralising antibody levels has the potential to inform public health surveillance of future novel SARS-CoV-2 variants.

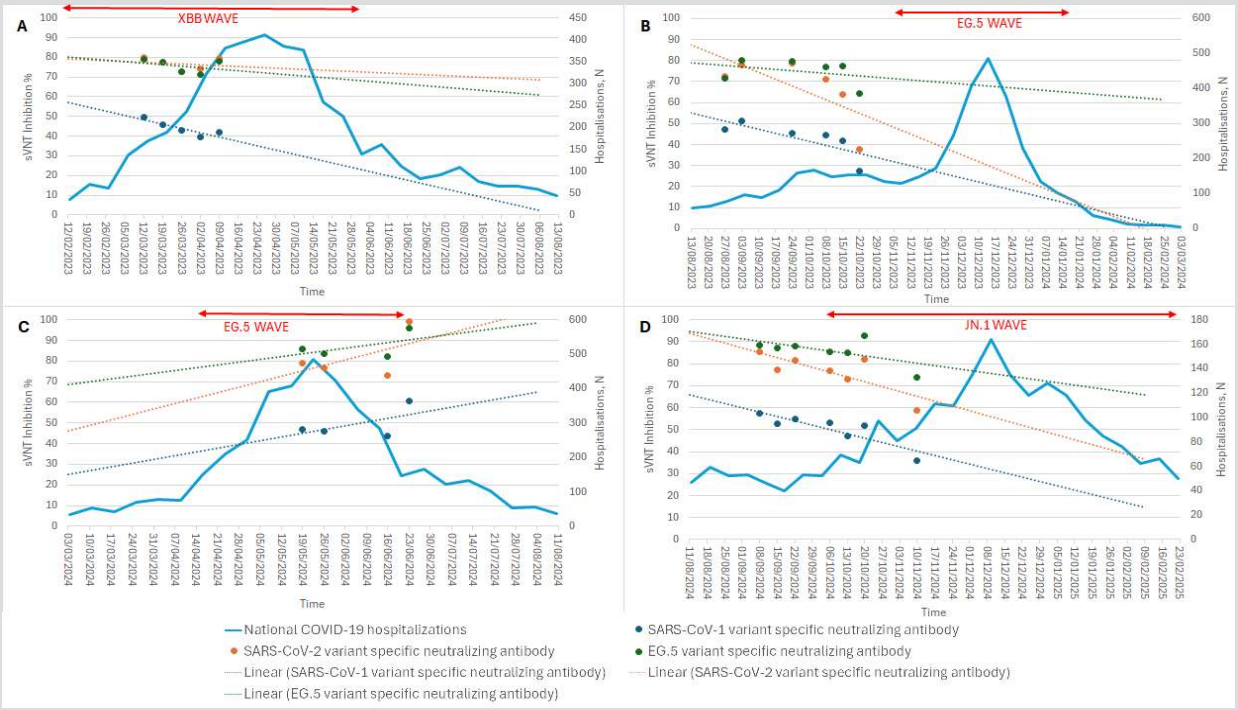

Fig 1(A-D). **Linear trends of SARS-CoV-1, SARS-CoV-2 and EG.5 variant specific neutralizing antibody in children and national COVID-19 hospitalizations attributable to novel SARS-CoV-2 variants.**

Funding: NMRC COVID19RF-0021

SingHealth DukeNUS ACADEMIC MEDICAL CENTRE

PATIENTS. AT THE HEART OF ALL WE DO.®

Singapore General Hospital · Changi General Hospital · Sengkang General Hospital · KK Women's and Children's Hospital · National Cancer Centre Singapore · National Dental Centre Singapore · National Heart Centre Singapore · National Neuroscience Institute · Singapore National Eye Centre · SingHealth Community Hospitals · Polyclinics SingHealth