

ABSTRACT

Background

The SARS-CoV-2 pandemic has resulted in rapid vaccine design and increased study into the antibody response to both the virus and vaccine targets. We compared the antigen specificity of antibody types in infected health care workers (HCW) over a 6 month period following diagnosed SARS-CoV-2 infection with an aim to determine specificity and persistence of antibody types.

Methods

Using the Genalyte Maverick 13 antigen- IgG and IgM panel to SARS-CoV-2 we analysed serum of 83 HCWs shortly after infection (V1) and 6 months (V2) subsequently to determine the specific antibody profiles. We also compared this assay to rapid point of care (POC) assays detecting anti-viral nucleocapsid and neutralising anti-Spike antibodies.

Results

Antibodies specific to SARS-CoV-2 nucleocapsid declined significantly ($P < 0.001$) after 6 months. However antibodies to SARS-CoV-2 Spike (S1, S1 RBD, S1/S2 and S2) persisted in the majority of volunteers, with no significant decline in the sample set, after 6 months. The Rapid POC tests confirmed these findings with the neutralising anti-Spike POC test giving comparable results to the sensitive lab based assay.

Conclusions

Detection of antigen specific antibody profiles to SARS-CoV-2 demonstrated decline of anti-nucleocapsid antibodies but persistence of anti-spike antibodies up to 6 months following natural infection in the HCW cohort. The utility of a rapid POC neutralising anti-Spike assay could prove a useful tool in detecting the immune status to SARS-CoV-2 but also aid as a pre-screen for identify cohorts requiring a vaccine booster.

References

This study is follow up to the publication by Faller et al, BMJ Open Vol 11, (6) 2021.

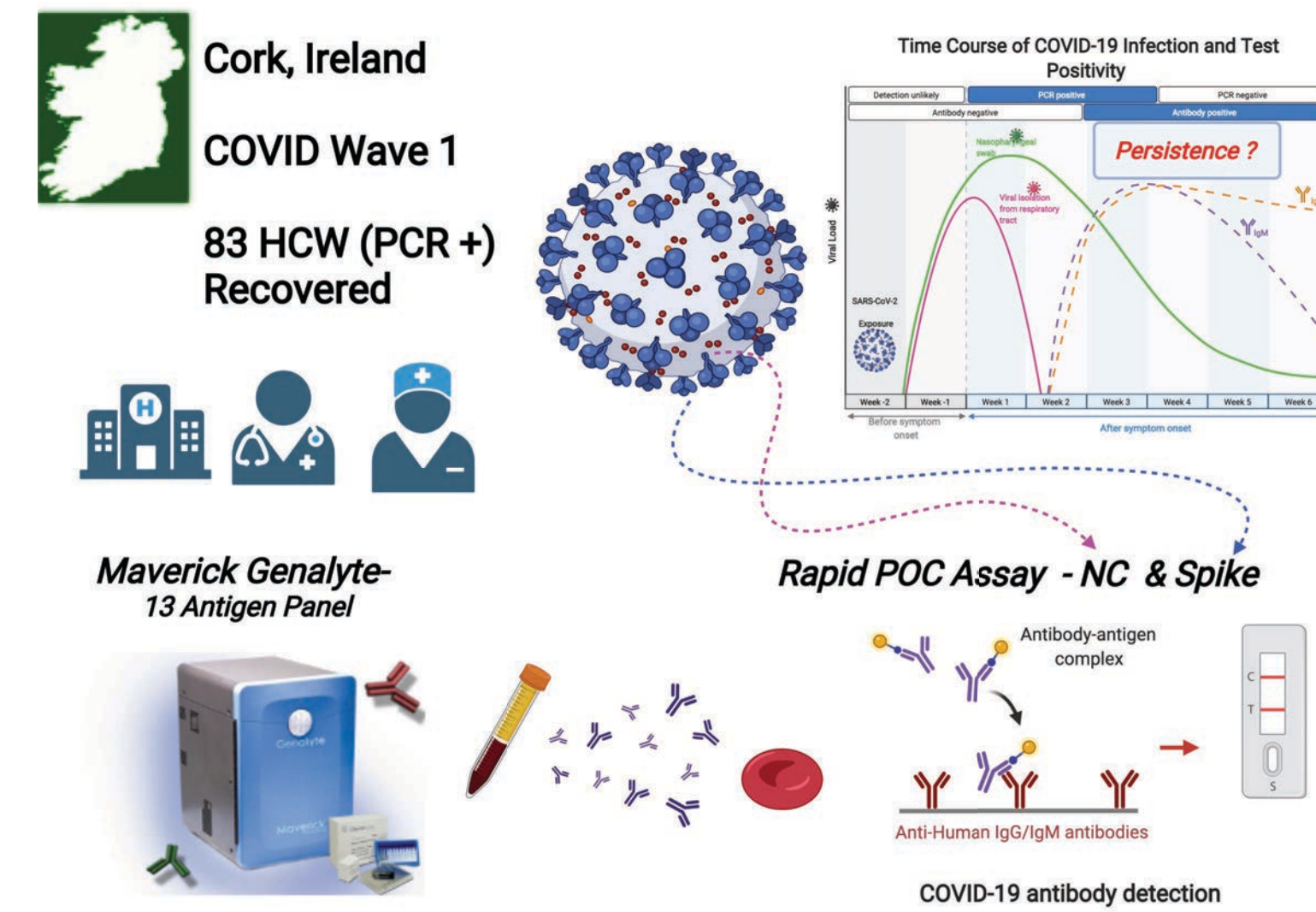
Samples:

HCW Serum & Blood from Wave 1 of COVID-19 pandemic (prior to vaccination drives)

Materials used:

- Genalyte Maverick SARS-CoV-2 Array (San Diego, USA).
- All-Test Anti Covid Ab Test (Nucleocapsid).
- Anti -Spike Neutralising kit (Healgen).

Methods & Results



Sampling Methodology for Visit (V1) and Visit 2 (V2) at 6 months.

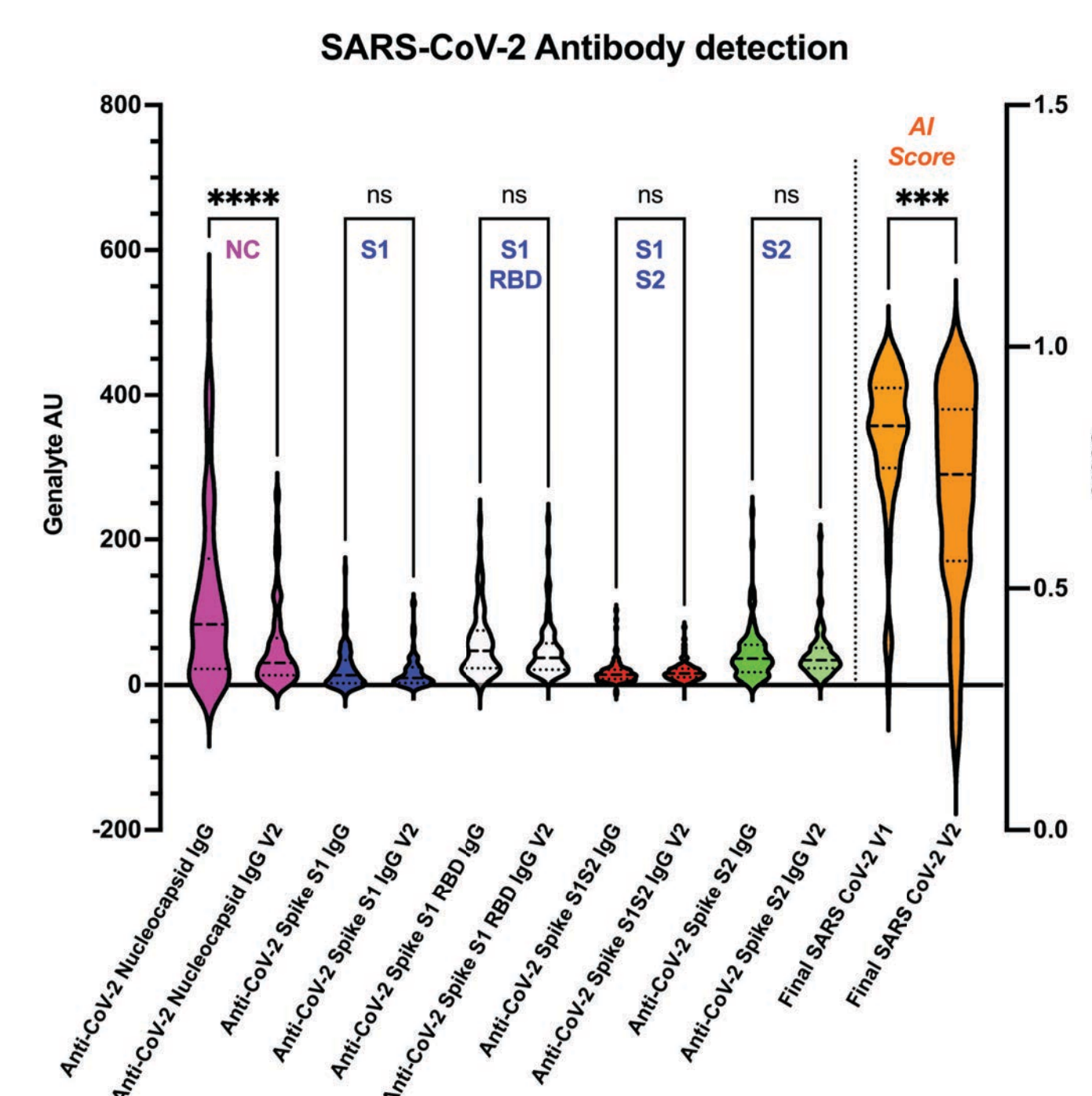


Fig 1. Antibodies detectable to SARS-CoV-2 specific antigens in serum of HCW at V1 and V2 (6 months). A.I. derived SARS-CoV-2 antibody composite score (Genalyte). Decline in Nucleocapsid antibodies is evident. N= 83.

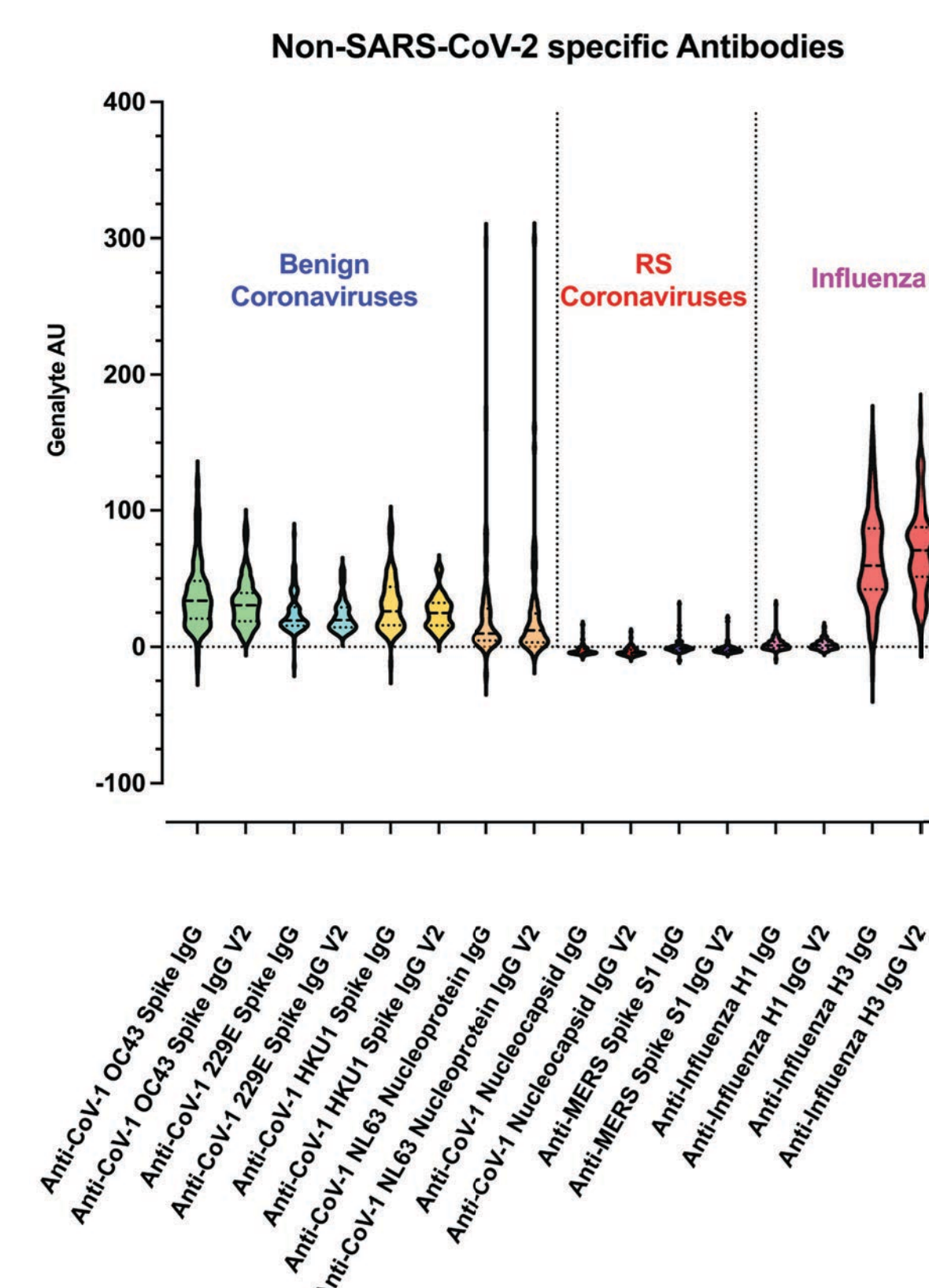
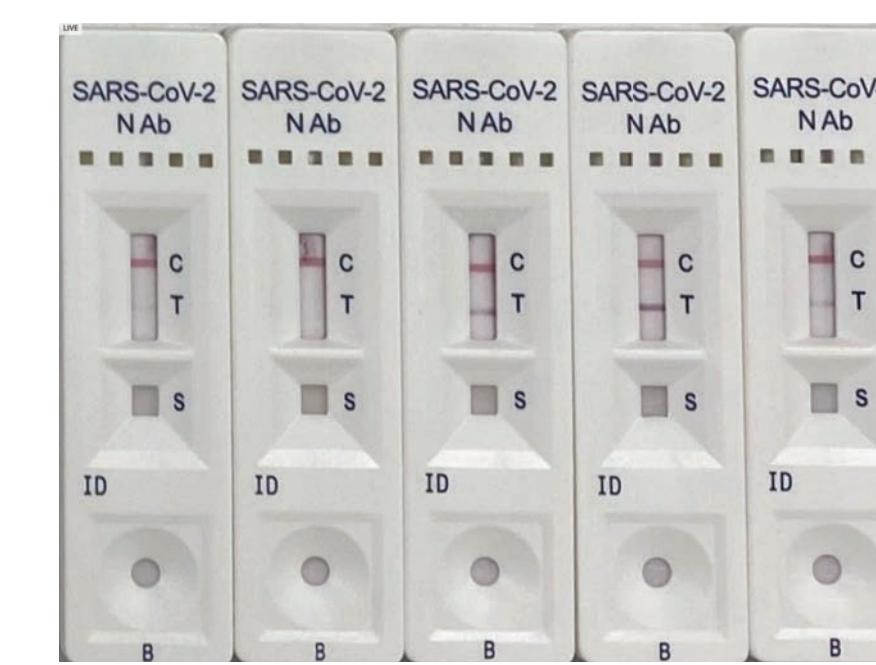


Fig 2. Non-SARS-CoV-2 detectable in HCW serum displaying antibodies to benign Coronaviruses and Influenza H3. N=83.



**Rapid POC Anti-Spike
Neutralising kit (Healgen)**

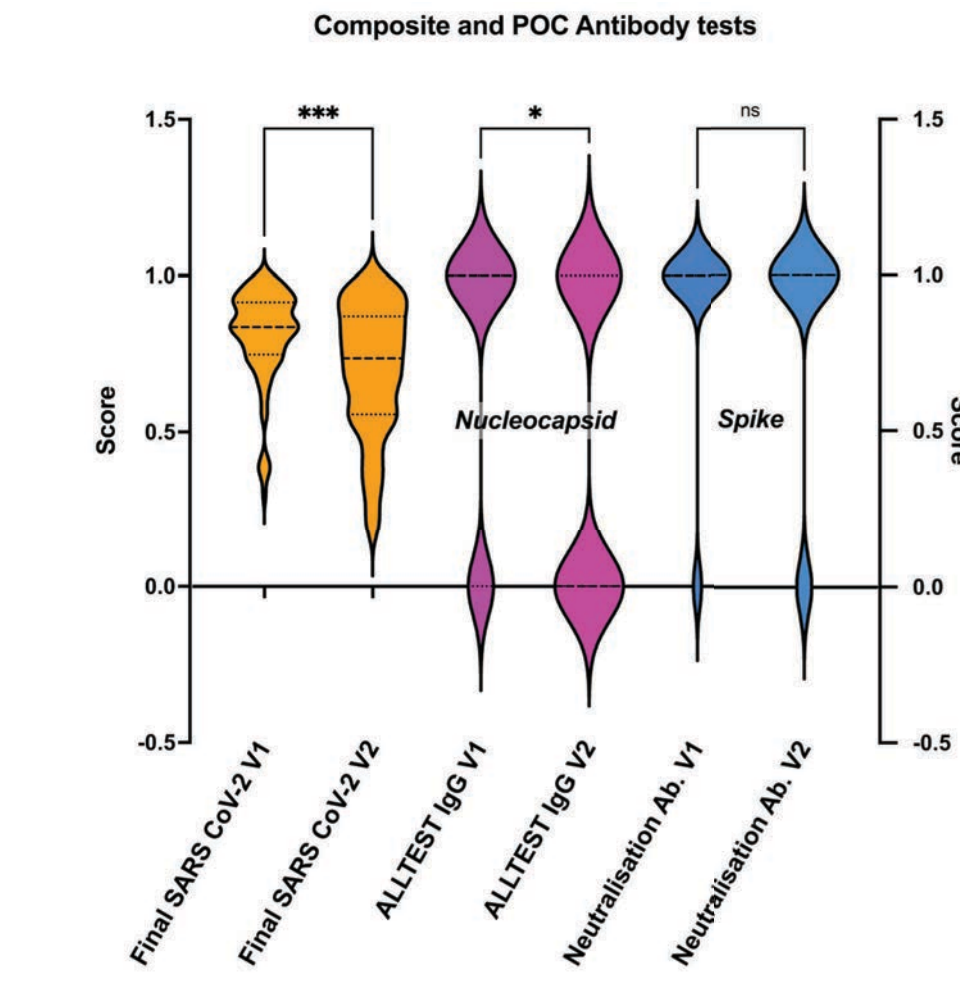


Fig3. Comparison of Antibody technologies at V and V2. N= 83

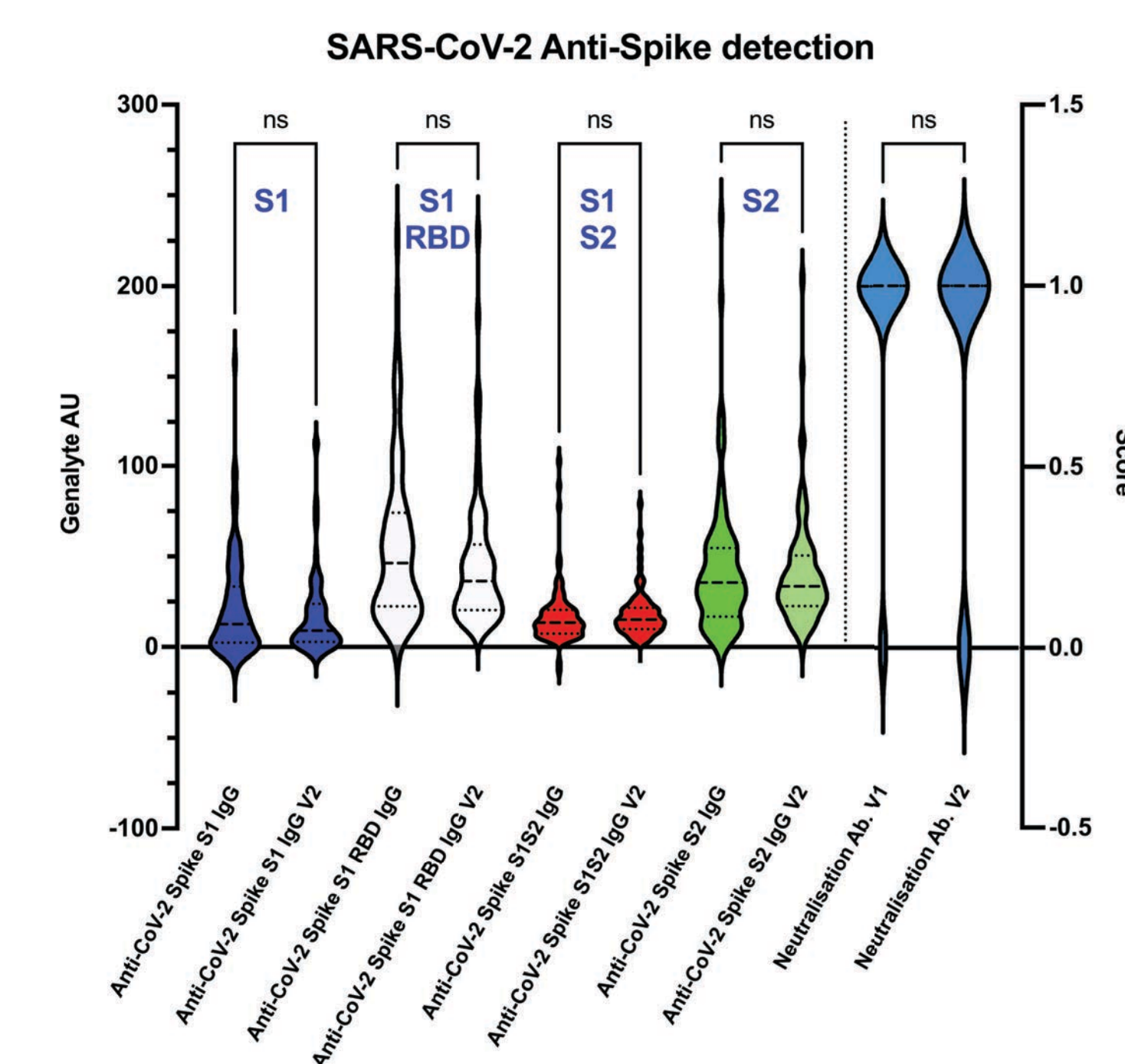


Fig 4. SARS-CoV-2 Spike specific antibodies detectable by both Genalyte and POC showing no significant decline of antibody detection upto 6 months in HCWs.N= 83.

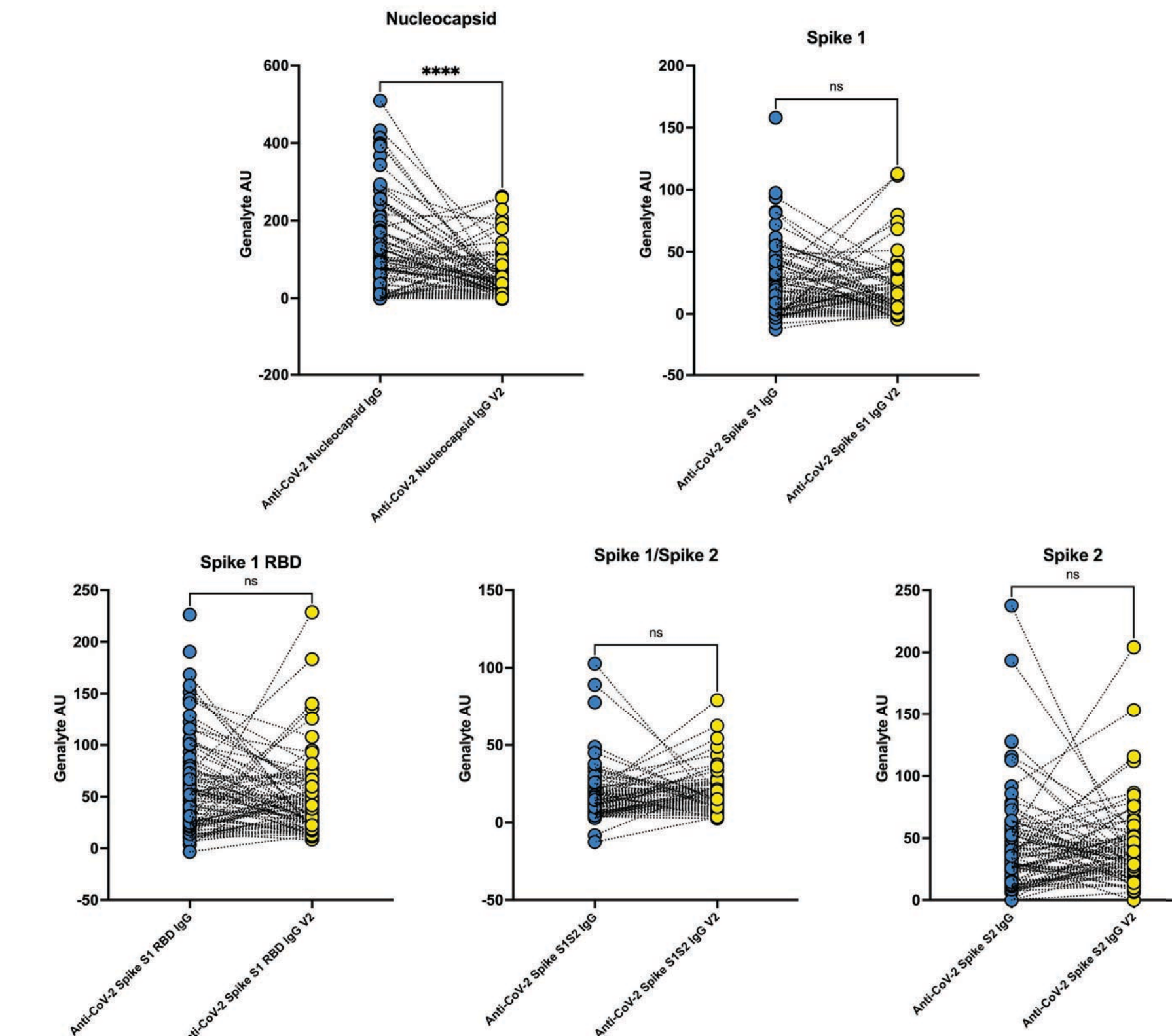


Fig 5. Dot plots of SARS-CoV-2 antigen specific antibodies demonstrating spike specific antibody persistence in HCWs during Wave 1. N= 83.

CONCLUSION

- Antibodies (Ab) specific to SARS-CoV-2 are detectable using rapid and ultrasensitive technologies.
- Nucleocapsid specific Ab decline rapidly within 6 months.
- Neutralising Ab to Spike proteins persist in naturally infected up to 6 months (Wave 1).
- Antibody screening prior to and after booster could be a useful screening tool .
- Rapid tests can allow for community screening and efficient mangement of vaccine stocks.

ACKNOWLEDGMENTS



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