

Supplementary Materials

Table S1. The sensitivity and specificity of each test system at manufacturer-claimed cutoff and estimated optimal cutoff by the alteration of cPASS cutoff.

| | Cutoff | 50% inhibition | | 70% inhibition | | 90% inhibition | |
|---------------|---------|--------------------|-------------------|--------------------|-------------------|--------------------|-------------------|
| | | Sn (95% CI)* | Sp (95% CI) | Sn (95% CI) | Sp (95% CI) | Sn (95% CI) | Sp (95% CI) |
| sCOVG | Claimed | 99.81 (98.9–100.0) | 28.39 (22.7–34.6) | 100.0 (99.0–100.0) | 17.44 (13.8–21.6) | 100.0 (98.2–100.0) | 12.45 (9.8–15.5) |
| | Optimal | 90.25 (87.4–92.7) | 83.90 (78.6–88.3) | 89.42 (85.8–92.4) | 78.21 (73.8–82.2) | 96.06 (92.4–98.3) | 76.74 (73.0–80.2) |
| CoV-2 IgG II | Claimed | 100.0 (99.3–100.0) | 8.05 (4.9–12.3) | 100.0 (99.0–100.0) | 4.87 (3.0–7.5) | 100.0 (98.2–100.0) | 3.48 (2.1–5.4) |
| | Optimal | 91.26 (88.5–93.6) | 84.75 (79.5–89.1) | 94.74 (91.9–96.8) | 77.44 (73.0–81.5) | 92.68 (88.2–95.8) | 83.88 (80.5–86.9) |
| Immuno-On IgG | Claimed | 97.09 (95.2–98.4) | 26.69 (21.2–32.8) | 97.78 (95.7–99.0) | 17.95 (14.3–22.1) | 98.54 (95.8–99.7) | 28.94 (25.2–32.9) |
| | Optimal | 82.14 (78.5–85.3) | 78.39 (72.6–83.5) | 80.89 (76.4–84.8) | 80.77 (76.5–84.6) | 84.39 (78.7–89.1) | 82.60 (79.2–85.7) |

The estimated cutoffs for each system that correspond to altered neutralization cutoff; 50%, 70%, and 90% inhibition were used as “optimal” cutoff in this analysis. * If there is no overlap in the 95% CIs between parameters, it can be interpreted as having a statistically significant difference at the significance level of 0.05 (5%). **Abbreviations:** Sn, sensitivity; Sp, specificity; CI, confidence interval; cPASS, GenScript cPASS SARS-CoV-2 neutralization antibody detection kit; sCOVG, Siemens SARS-CoV-2 IgG; CoV-2 IgG II, Abbott SARS-CoV-2 IgG II Quant; Immuno-On IgG, Osang Immuno-On™ COVID-19 IgG test.

| | | | | |
|----------|----------------------|----------------------------|----------------------------|----------------------------|
| A | Immuno-On IgG | 0.748 (0.716-0.779) | 0.562 (0.526-0.598) | 0.370 (0.336-0.406) |
| | CoV-2 IgG II | 0.710 (0.676-0.742) | 0.505 (0.468-0.541) | 0.297 (0.264-0.331) |
| | sCOVG | 0.772 (0.741-0.802) | 0.570 (0.534-0.606) | 0.362 (0.328-0.398) |
| | | 50% inhibition | 70% inhibition | 90% inhibition |
| B | Immuno-On IgG | 0.808 (0.778-0.836) | 0.807 (0.777-0.835) | 0.830 (0.801-0.856) |
| | CoV-2 IgG II | 0.891 (0.866-0.912) | 0.856 (0.829-0.881) | 0.862 (0.835-0.885) |
| | sCOVG | 0.880 (0.855-0.903) | 0.834 (0.805-0.860) | 0.819 (0.790-0.846) |
| | | 50% inhibition | 70% inhibition | 90% inhibition |

Figure S1. Concordance and 95% CI of qualitative decision of each test system with cPASS following the change in % inhibition cutoff for neutralization, (A) when the manufacturer-claimed cutoff for each test was applied or (B) the estimated cutoff for each test corresponding to change of neutralization cutoff was applied. If there is no overlap of 95% CIs, it can be interpreted as having a statistically significant difference at the significance level of 0.05.

Acknowledgement

Siemens Healthcare Diagnostics Inc., Abbott Laboratories, and Osang Healthcare Inc. showed their support through the provision of anti-SARS-CoV-2 IgG test kits. Siemens, Abbott, and Osang did not play any role in the study design or data analysis.

Author contributions

All authors have accepted responsibility for the entire content of this manuscript and approved its submission. J. D. Seo collected and analyzed the data and wrote the initial draft. H.-W. Moon designed and supervised the study and finalized the draft. M. Nam collected and analyzed the data. T. H. Lee, Y.-S. Ahn, S.-H. Shin, and H.Y. Han collected the samples and performed the tests.

Institutional Review Board Statement

This study was conducted after obtaining approval from the Institutional Review Board of our institution. (IRB No. KUMC 2021-05-033)

Informed Consent Statement

All subjects were ≥ 18 years of age at enrollment and written informed consent was obtained.

Data Availability Statement

A data set of serological responses of 930 samples was deposited at <https://dataverse.harvard.edu/> (<https://doi.org/10.7910/DVN/CMRD77>).

Conflict of Interest

The authors declare no conflicts of interest.