**Frequently Asked Questions About COVID-19**

**Antibody Testing**

**Version: 28 April 2020**

1. What are the indications for serological testing for SARS-CoV-2 (COVID-19)?
* Patients who have had a prior illness consistent with COVID-19 or known exposure to SARS-CoV-2 more than 21 days ago
* For patients who have previously tested by positive by SARS-CoV-2 PCR, consider whether serologic testing would change medical management

**CAUTION:**

* **Serological testing is NOT indicated for diagnosis of acute infection and should not be ordered while a patient is being investigated for active SARS-CoV-2 infection**
* For patients with new or persistent COVID-19 symptoms, or if there is concern for active infection, molecular testing (PCR) with a nasopharyngeal swab is recommended prior to considering serologic testing
* It is unknown if a positive antibody test indicates any level of short or long term protection against SARS-CoV-2; antibody test results should not be used to guide return to work decisions
* Immunocompromised patients who have COVID-19 may have a delayed antibody response and produce levels of antibody which may not be detected as positive by the assay
1. What COVID-19 serology test do you offer?
	* UW Virology is performing the Abbott SARS-CoV-2 IgG immunoassay on the ARCHITECT instrument. This is a chemiluminescent microparticle immunoassay (CMIA) used for the qualitative detection of IgG antibodies to SARS-CoV-2 nucleocapsid protein in human serum and plasma. This is a high-throughput automated system allowing for the testing of many samples each day.
2. What is the target antigen used in the Abbott immunoassay?
	* The Abbott SARS-CoV-2 IgG immunoassay detects antibodies to the viral nucleocapsid protein (NP).
3. How are the results reported, and what is the clinical significance?
	* The results are either “positive” or “negative” based on the manufacturer-indicated cutoff.
	* A negative result indicates that either a person has not been infected with SARS-CoV-2 or there is not a detectable level of antibody present. Explanations for this may include a very recent exposure such that not enough time has elapsed to generate an immune response, or the immune response has decreased below the detectable level. Patients with immune deficits may also not produce antibody levels detectable by this assay. A negative result therefore does not rule out current or past infection with SARS-CoV-2.
	* A positive result likely indicates previous or current infection. Recent studies examining serial plasma samples in hospitalized patients with SARS-CoV-2 infection suggest that the median time to seroconversion is about 10 days in moderately ill patients, and 14 days in severely ill patients.1,2 It is important to note that a positive serology test cannot distinguish between active or past COVID-19. If there is concern for active infection, molecular testing (PCR) with a nasopharyngeal swab is recommended.
	* Due to an overall low absolute prevalence of SARS-CoV-2 infection locally, false positives will occur.
	* At this time, it is not known whether the presence of antibodies confers protection from reinfection with SARS-CoV-2, how long the antibody response lasts, or the association between antibody response and clinical outcomes of individuals with COVID-19.
4. What sample types are accepted?
	* Serum and plasma.
	* Acceptable tube types: Red top, Gold top (SST), Orange top (RST), pearl PPT, plasma from EDTA tube
	* We prefer whole blood to be spun within 2 hours of collection and can accept specimens spun within 24 hours of collection.
	* Samples are stable for 7 days at 2-8°C once separated from a clot or red blood cells, or in a gel separator tube.
	* If specimen processing is expected to be delayed more than 7 days store at -20°C or colder.
	* A minimum of 0.5mL of serum or plasma is required.
5. How sensitive is this test?
	* This depends on the time after infection. According to published series, at 2 weeks after onset of symptoms, sensitivity is over 50%. At approximately 25 days after symptomatic infection in hospitalized patients, the sensitivity approaches 100%. The Abbott product insert reports higher sensitivity, with 91% sensitivity by 14 days after symptom onset. The sensitivity of the test among subjects with asymptomatic infection is unclear, and the duration of positive results (seropositivity) is unknown.
6. How specific is the Abbott test? Does it cross react with other human coronaviruses?
	* This assay does not appear to cross-react with other human coronaviruses, but this type of cross-reactivity cannot be completely ruled out.
	* The product insert of the assay reports a specificity of 99.6%.
7. What are the limitations of this test?
	* This is not intended for acute diagnosis early in the course of disease. As stated above, negative results do not rule out a SARS-CoV-2 infection. For patients in who there is a high clinical suspicion for COVID-19 is high, PCR-based testing is recommended to evaluate infection. **Antibody testing should NOT be used alone to diagnose COVID-19.**
	* False-positive results rarely may occur as the result of infection with non-COVID-19 human coronaviruses.
	* Immunocompromised patients with COVID-19 may not have detectable levels of antibodies, or have a delayed antibody response.
8. What is the turnaround time?
	* Within 1 day.
9. My patient has a positive serology result and is interested in being a potential plasma donor. Where can I refer this patient for more information?
	* This assay is not meant for the screening of donated blood. However, if a patient is interested in being a potential convalescent plasma donor, please refer him or her to the following website: <https://newsroom.uw.edu/news/plasma-donors-sought-among-those-recovered-covid-19>
	* At the bottom of this website is the contact information patients can use to get more information about participating.
10. My patient had a positive (or negative) test at another site using another assay. How does this assay differ from other tests?

There are an emerging number of serologic assays which are becoming increasingly available. A number of these assays are developed using different methods of collection (e.g. fingerstick vs. blood draw), systems for analysis (e.g. lateral-flow assays vs. ELISA), and to date most have not been compared. Available data suggests a wide range of sensitivity of these assays6, so patients with testing from other sites (particularly those which rely on local or non-FDA approved assays) should be interpreted with caution. Repeat testing to confirm results can be considered depending on the clinical utility of such results.

References

1. Zhao J, et al. Pre-print. 2019medRxiv 2020.03.02.20030189 available [here](https://www.medrxiv.org/content/10.1101/2020.03.02.20030189v1.full.pdf)
2. Huang AT, Garcia-Carreras B, Hitchings MDT, Yang B, Katzelnick L, Rattigan SM, et al. A systematic review of antibody mediated immunity to coronaviruses: antibody kinetics, correlates of protection, and association of antibody responses with severity of disease. medRxiv preprint. 2020 Cold Spring Harbor Laboratory Press:2020.04.14.20065771. available [here](https://www.medrxiv.org/content/10.1101/2020.04.14.20065771v1.full.pdf)
3. <https://www.corelaboratory.abbott/us/en/offerings/segments/infectious-disease/sars-cov-2>
4. <https://newsroom.uw.edu/news/plasma-donors-sought-among-those-recovered-covid-19>
5. WHO “Immunity Passports” in the Context of COVID-19 <https://www.who.int/news-room/commentaries/detail/immunity-passports-in-the-context-of-covid-19> (accessed 25 April 2020)
6. Whitman JD, Hiatt J, Mowery CT, et al. Test performance evaluation of SARS-CoV-2 serologic assays. Preprint. Available here: https://www.dropbox.com/s/cd1628cau09288a/SARS-CoV-2\_Serology\_Manuscript.pdf