

BCH Provider FAQ for SARS CoV-2 PCR

July 17, 2020

Real-time RT-PCR is the gold standard to detect respiratory viruses in individuals with symptoms, including RNA from SARS-CoV-2. Collecting sample by nasopharyngeal swab (NP) is considered the best sample based on current available information.

- ❖ What is the analytical sensitivity of the PCR tests for detection of SARS-CoV-2 RNA?
 - We are using 3 assays. Two assays run in BCH laboratory (*). Where samples are sent is subject to change.
 - Women admitted for delivery [SARS-CoV-2 RNA (BCH)]: Cepheid* RT-PCR detects viral RNA down to 250 copies/mL.
 - Admission to hospital with symptoms [Respiratory Pathogen Panel with SARS-CoV-2]: Biofire* RT-PCR detects SARS-CoV-2 RNA down to 5 copies/mL.
 - Community Screening [Coronavirus, Covid-19 (Community screening)] and Surgical Asymptomatic Screening [COVID-1, pre-procedure (asymptomatic screening)] and Employee testing: Biodesix droplet digital PCR has analytical sensitivity of 200-450 copies/mL.
- ❖ What is the clinical sensitivity of the PCR tests using NP swabs?
 - Although sensitivity and specificity of NP swab can vary based on sampling technique and time of sampling with respect to disease course, a recent article summarized sensitivity as 97% (95% CI: 92 to 100) and specificity 100% (95%CI: 99 to 100).
 - For reference point, NP swabs from patients in the first three days after onset of symptoms contain about 1,000,000 copies/mL.
- ❖ How frequent are false positive results with the SARS CoV-2 PCR test?
 - No false positives have been identified yet here at BCH.
- ❖ What is the Negative Predictive Value (NPV) of SARS CoV-2 PCR? I am worried that the test is not accurate when screening asymptomatic patients prior to procedures.
 - The test is accurate based on estimated low prevalence of disease in Boulder CO mid-May 2020, which is estimated to be less than 5% and likely near 1%
 - NPV is greater than 99% based on prevalence
 - Even if prevalence predicted to be as high as 10%, NPV is estimated at 97.2%
- ❖ How frequent are false negative results in symptomatic patients?
 - No false negative results have been identified at BCH in patients who have had repeat testing, including individuals who have had lower tract respiratory sampling. Limitation is that sample size is small.
 - Most False negatives are not due to the analytic sensitivity of the test, but originate from:
 - Improper NP swab technique
 - <OR>**
 - Lower tract infection with SARS-CoV-2
 - Repeat testing is not recommend unless:
 - There is suspicion of a sampling error (e.g. mislabeled swab container, inadequate swabbing technique).

- High suspicion for disease then ID should be consulted for guidance. See guidance on repeat testing on the Scoop.
 - https://mybch.sharepoint.com/:w:/r/depts/InfectionPrev/_layouts/15/Doc.aspx?sourcedoc=%7BD32F9FDD-E28B-46DC-B5EB-EEEE103D3581%7D&file=BCH%20Process%20and%20interpretation%20of%20Negative%20SARS-CoV-2%20PCR%20results%20and%20Isolation%20Status.docx&action=default&mobileredirect=true
- ❖ Is it really necessary to swab nasopharynx on both sides for 15 seconds? Sampling error is the most common cause of false negative. If the patient is very young, on blood thinners, or due to anatomy unable to access both sides then it is okay to swab for shorter time or only one side. It remains critical to access the nasopharynx on at least one side for 15 seconds.

References:

IDSA Guidelines on the Diagnosis of COVID-19, 5/6/2020. <https://www.idsociety.org/COVID19guidelines/dx>

Zhen W et al. Comparison of four molecular *in vitro* diagnostic assays for the detection of SARS-CoV-2 in nasopharyngeal specimens. *J Clin Microbiol* 2020 Apr 27

<https://infectioncontrol.ucsfmedicalcenter.org/sites/g/files/tkssra4681/f/COVID-19-testing-reference-sheet.pdf>

<https://www.jwatch.org/na51583/2020/05/22/pcr-assays-sars-cov-2-testing-tests>

BCH Provider FAQ on COVID-19 Antibody Testing

COVID-19 antibody testing is available at BCH.

Anti-SARS-CoV2-IgG

How does an antibody test to SARS-CoV-2 help our patients?

SARS-CoV-2 IgG may identify past infection. BCH has in house testing by Ortho –Clinical Diagnostics which has sensitivity 90% and specificity 100%. When screening for low prevalence disease high specificity is more critical. Negative predictive value at a prevalence of 5% is 99.5%. NOTE: these tests are not FDA approved, but has been deemed by FDA that clearance was not necessary. <https://www.fda.gov/medical-devices/emergency-situations-medical-devices/eua-authorized-serology-test-performance>

SARS-CoV-2 antibody tests are NOT intended to identify patients in the early stages of disease as average time to onset of presence of IgG is 11 days. In addition, individuals during illness or immediately after illness would pose an infectious disease risk to health care workers drawing their blood. Providers should order Coronavirus, Covid-19 (Community Testing) NP swab, which is the PCR test, if someone is acutely ill.

What test should I order?

First, it is critical to review with the patient the risk and benefits of coming in for a blood draw during the COVID-19 pandemic and the patient must have no symptoms. When the patient comes in to one of the BCH phlebotomy sites, they must wear a mask of some sort as long as community masking is recommended by the state of Colorado or as required by BCH.

The infectious diseases service only recommends using IgG (Anti-SARS-CoV2-IgG) on outpatients in the following scenarios: 1) symptom free for at least 7 days, or 2) at least 21 days from symptom onset, or 3) never had symptoms. The main use of IgM would be to send on inpatients that are SARS-CoV-2 PCR negative, but there is a high clinical suspicion. Recommend consultation with ID service if you believe IgM warranted.

How do I interpret anti-SARS-CoV-2 IgG antibody test results? Does it mean that an individual is protected or immune from COVID-19 in the future?

A positive IgG for SARS-CoV-2 suggests prior infection; however, it is not yet clear whether a positive IgG will confer immunity or how long immunity might last. If the IgG is positive, we still recommend following current guidance from CDPHE about social distancing and hand and respiratory hygiene. At this time, this is not an approved criterion to return to work or other activities.

A negative IgG suggests that person has not had prior infection, but it could be falsely negative for two reasons: if there has not been enough time between symptoms and collection of blood; or some people do not develop antibodies after infection.

Is an individual with a positive SARS-CoV-2 IgG test eligible to donate plasma?

Currently, a positive SARS-CoV-2 IgG test does NOT meet BCH criteria for plasma donation. A positive SARS-CoV-2 PCR swab in the past is required to meet BCH criteria for plasma donation.

What ICD-10 code could be used when ordering IgG?

Z01.84 – Encounter for Antibody Response Examination

Add-ons when appropriate given documented circumstances:

- Z87.09 Personal history of other diseases of the respiratory system
- Z20.828 Contact with and (suspected) exposure to other viral communicable diseases

If a patient has high risk comorbid chronic conditions that make them higher risk, I would add those in as well (e.g., Diabetes, COPD, Asthma, Coronary Artery Disease, Congestive Heart Failure, etc.)

** Please note, guidance from the AMA suggests these tests will be covered by insurance, but specific reimbursement is unknown and coverage is not guaranteed.*

What sample should be collected? 10mL serum in SST tube or red tube. SST tube is preferred.