Key Findings

- Patients with higher and prolonged IgM antibodies are associated with more severe illness, poor recovery, and prolonged viral shedding (some patients may shed virus for more than 30 days).
- Patients who respond weakly to IgG have higher viral clearance rate than strong responders.
- There were no reports with direct information regarding infectiousness of patients.

Limitations

- Studies are of moderate to low quality, mostly due to small sample sizes.
- Some of the references are available as preprints and are pending peer review.

GRADE of Evidence: B - Moderate

A grade of "B" is assigned when further research is likely to have an important impact on
confidence in the estimate of effect and may change the estimate. The review may include one high quality study and/or several studies with some limitations.

For more information about how this rating was determined, visit https://www.essentialevidenceplus.com/product/ebm_loe.cfm?show=grade

Background
The EOC has requested more information regarding whether serology has a role in the clinical care of COVID-19 patients. One component of this larger question is to understand the relationship between antibody development and viral shedding and infectiousness.

Research Question(s)
- What is the relationship between antibody development and viral shedding and infectiousness?

Method
A rapid review of the literature was performed to answer this question. This method entails a brief scan of the relevant literature to gather publications with potentially relevant information to the question at hand. These publications are reviewed by a team of experts (library, research, and clinical staff) to determine the quality of the data and provide recommendations based on the question and available data. The rapid review is performed over a period of several days to provide a quick response, based in evidence, to a policy question. Note: this is not the same as a systematic review which has much more stringent criteria for analysis and requires a longer turnaround time for results.

PICO Statement

<table>
<thead>
<tr>
<th>P – Patients/Population</th>
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<tbody>
<tr>
<td>I – Intervention/Indication</td>
<td>N/A</td>
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<td>C – Comparator/Control</td>
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<td>O – Outcome</td>
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Search Strategy
PubMed Strategy: ((((((coronavirus OR "corona virus" OR coronavirinae OR coronaviridae OR betacoronavirus OR covid19 OR "covid 19" OR nCoV OR "CoV 2" OR CoV2 OR sarscov2 OR 2019nCoV OR "novel CoV" OR "wuhan virus") OR ((wuhan OR hubei OR huanan)))))) AND ((antibody[Text Word] OR antibodies[Text Word]))) AND ("Virus Shedding"[Mesh]) OR ("virus shedding" OR "viral shedding"))) AND (infectio*[Title/Abstract] AND ( "2019/01/01"[PDat] : "2020/12/31"[PDat] )) Filters: Publication date from 2019/01/01 to 2020/12/31

Inclusion Criteria
Articles were searched from 2019 to the present. No exclusions were applied.
Sources

The following sources were searched: Pubmed, CDC Database, WHO database, PHAC database, OVID Medline, Embase, MedRiv, bioRiv

Summary of Evidence

Only one study looked at both antibody production and viral shedding concomitantly [9]. The authors determined that patients with higher and prolonged IgM antibodies are associated with more severe illness, poor recovery, and prolonged viral shedding. Conversely, patients who respond weakly to IgG have higher viral clearance rate than strong responders. This study is based on a sample of 67 patients, limiting the ability to generalize the findings.

While most studies report that viral load is highest in throat swabs from patients at the time of symptom onset [1, 15], others have reported median times from onset to viral RNA detection in nasopharyngeal samples and feces to be approximately 7 and 11 days, respectively [4]. Viral shedding appears to last approximately 2-3 weeks in nasopharyngeal, sputum, and stool samples. One study indicates that approximately 10% of patients may shed virus for 30 days or more [14]. While individual studies are low to moderate in terms of the quality of their evidence (mostly due to small sample sizes), when taken together they make a stronger case for the data.

When viewed in the context of data from the previous question (What is the time course of antibody development in the clinical course of the disease?), it becomes apparent that seroconversion appears to precede or appear concomitantly with a reduction in viral shedding between 2-3 weeks post onset of symptoms.

Important points in several papers indicate that fecal-oral transmission of COVID-19 is a possibility, even after clinical recovery, as viral RNA was detected in feces beyond the point of detection in the nasopharynx [4, 7, 8].

Conclusions

For the majority of patients antibody development occurs at approximately the same time as viral detection starts to wane (2-3 weeks post onset of symptoms). This does not necessarily indicate the patient is no longer infective and some patients may shed virus for more than 30 days. While viral shedding appears to be most common through the upper respiratory tract, other bodily fluids and feces are also indicated to spread the virus. Patients with higher and prolonged IgM antibodies are associated with more severe illness, poor recovery, and prolonged viral shedding. Conversely, patients who respond weakly to IgG have higher viral clearance rate than strong responders.
References Included in Summary


