Bacterial infections in patients with COVID-19

PREVALENCE OF BACTERIAL INFECTIONS IN PATIENTS WITH COVID-19

- The estimated overall prevalence of bacterial infections identified in respiratory and/or blood specimens among patients with COVID-19 **ranges from 6.9 to 8.8%.**
- Given the low frequency, predisposing factors of bacterial infections, and possible alternative explanation for the patient's clinical presentation or deterioration ought to be considered in the context of COVID-19. Potential benefits should be balanced against the risk of adverse events.
- The quality of available literature is subject to reporting bias, especially during the first year of the pandemic when microbiological investigations for diagnosing bacterial infections were limited.

Stratified by patient care setting and healthcare exposure

Case setting and timing of diagnosis of bacterial infection	Overall	Mixed hospitalized and outpatient population	Hospitalized (ward) patients	Critically ill (ICU) patients
Co-infections identified on admission or up to 48h thereafter	5.1%	1.2%	4.4%	15.4%
Secondary infections, identified more than 48h after admission	13.1%	11.1%	8.2%	41.9%

Predictors of bacterial co-infection and secondary infection

- Admission to ICU due to COVID
- Mechanical ventilation
- Male sex may be associated with higher risk of secondary infection

Treatment with immunosuppressive therapy for COVID, specifically corticosteroid (e.g., dexamethasone, prednisone) and interleukin-6 inhibitors (e.g., tocilizumab, sarilumab) was not associated with higher risk of bacterial infections based on limited data. Guidance for treatment of COVID-19 can be found here.

Top 5 most common organisms in order of decreasing frequency, from respiratory or blood specimens

Co-infection	Secondary infection
S. aureus	*S. aureus*
Klebsiella spp.	*Klebsiella spp.*
E. coli	*Pseudomonas spp.*
Pseudomonas spp.	*S. pneumoniae*
Streptoccocci	*Enterococcus spp.* and *E. coli* had nearly the same frequency

- **Bacteria identified in secondary infections were more diverse and reflected healthcare-associated pathogens, including multidrug-resistant organisms.**
- Coagulase negative staphylococci were often isolated in blood cultures due to contaminanation in the process of taking blood samples, and may not constitute a pathogen requiring treatment with antibiotic.

TREATMENT OPTIONS

Antibiotics should only be initiated if there is clinical suspicion of additional bacterial infections, and be given for the shortest possible duration.

If indicated, empirical reigmen should be guided by **local epidemiology, patient factors (e.g. prior antibiotic exposure, duration of hospitalization, duration of mechanical ventilation, colonization status), and healthcare setting**. Reassess based on clinical response and microbiology results.

- Bloodstream infections: select antibiotic regimen based on microbiology results. See also guidance on management of central line infections (link).
- Respiratory tract infections:

	Outpatient	Hospitalized patients	Critically ill patients
Co-infections	Refer to community-acquired pneumonia guideline (link)		
Secondary infections	Refer to community-acquired pneumonia	• Ceftriaxone 1g IV daily or • Amoxicillin-clavulanate 875/125 mg PO BID Add vancomycin as needed	• Piperacillin-tazobactam 4.5g IV q6h or • Meropenem 1g IV q8h Add vancomycin as needed

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Ontario Science Table COVID-19 treatment guideline https://covid19-sciencetable.ca/

National Health Services UK COVID-19 guidance https://www.nice.org.uk/guidance/ng191