Antimicrobial stewardship interventions to minimize healthcare worker exposure to SARS-CoV-2

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To the Editor—Antimicrobial stewardship programs responded to the coronavirus disease 2019 (COVID-19) pandemic by developing treatment pathways to monitor the use of potential COVID-19 therapies to ensure appropriate management and to mitigate toxicities.[1,2] These approaches mimicked traditional stewardship efforts by using the shortest effective duration of therapy, assessing drug–drug interactions, and monitoring drug safety and efficacy parameters. Given the rapid rise in the number of patients with confirmed or suspected COVID-19 cases combined with the national shortage of personal protective equipment (PPE), we identified an immediate opportunity for pharmacists, as integral members of the antimicrobial stewardship team, to help conserve PPE and limit healthcare worker (HCW) exposure by consolidating the number of times medications needed to be administered throughout the day.

In our hospital's pharmacy practice model, decentralized pharmacists perform daily patient chart reviews to optimize pharmacotherapy, including antimicrobials. Pharmacists utilize a clinical surveillance software (Theradoc, Premier, Charlotte, NC) using both real-time alerts and structured workflows for anticoagulation monitoring, renal dose adjustments, therapeutic drug monitoring, and microbiology review. We leveraged existing work flow and infrastructure to develop this consolidation initiative. By incorporating positive SARS-CoV-2 PCR results into pharmacists' daily workflow via our surveillance software, pharmacists can easily identify these patients and assess their medication administration record for optimization. Persons under investigation were identified during routine chart review.

The initiative provided pharmacists with guidance on strategic methods of consolidating the medication administration record based on 3 domains: (1) consolidation of medication administration times, (2) optimizing pharmacotherapy, and (3) therapeutic drug monitoring.

Consolidation of medication administration times

Throughout the course of a patient's hospital stay a patient's medication administration records can become complex as medications are added and administration times are changed. For example, at our institution, if a prescriber orders a medication every 24 hours, the medication administration time will default to the next hour. If the start time is not critical, the medication could be given at a time when other medications are already scheduled. Additionally if a medication is ordered every 8 hours (default times: 6:00 AM, 2:00 PM, and 10:00 PM), modifying the administration times to 9:00 AM, 4:00 PM, and 9:00 PM would align better with medications ordered every 12 hours (default times: 9:00 AM and 9:00 PM) and would reduce the number of times nurses would need to enter the room and use PPE. We provided guidance to pharmacists to consolidate medication times while considering safety of early or late doses during the transition and potential drug–drug interactions (eg, doxycycline with calcium supplementation). High-risk medications such as antimicrobials, antiepileptic agents, anticoagulants, and immunosuppressive agents required consultation with the provider.

Optimizing pharmacotherapy

We encouraged pharmacists to recommend therapy modifications that maintained both safety and efficacy, while decreasing exposure to HCWs. For example, a patient on twice-daily isophane insulin as an outpatient may be able to switch to once-daily long-acting insulin as an inpatient. This approach later led to the implementation of a streamlined protocol for managing mild-to-moderate diabetic ketoacidosis with subcutaneous insulin. Pharmacists also focused on opportunities to switch patients from intravenous to oral therapy based on our hospital's protocol as a means to reduce entering patient rooms, since oral therapy only requires 1 visit, but intravenous therapy requires a second visit after the infusion is complete. Furthermore, pharmacists advocated for stopping antibiotics in patients with confirmed SARS-CoV-2 but no microbiologic evidence of bacterial infection. Discontinuing unnecessary antimicrobials reduces the risk of adverse effects including *Clostridiodes difficile* infection, which would further complicate a patient's hospital course and likely result in increased use of PPE for additional medication administration.

Therapeutic drug monitoring

At our institution, pharmacists are responsible for vancomycin dosing and monitoring. We encouraged pharmacists to reduce unnecessary testing (eg, uncomplicated skin and soft-tissue infections or anticipated short course of therapy) to help further decrease HCW exposure. If the pharmacist determined that a test was needed, the pharmacist placed a timed order or a phlebotomy or nursing order. We partnered with phlebotomy leadership to determine their high-volume times for routine laboratory tests, and we reviewed their staffing model. Ideal times were identified in the morning and the evening for patients located in both the intensive care units and wards to collect samples for testing vancomycin levels and to minimize PPE use. Pharmacists used these preferred times to obtain samples to test levels or extrapolated levels if needed.

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These efforts have reduced unnecessary patient room entry, minimized HCW exposure, and conserved PPE supply. Our interventions serve as a model for leveraging the collaborative relationship between pharmacists and antimicrobial stewardship programs during the COVID-19 pandemic. With some modifications to accommodate other institutions' work flows, this initiative can be adapted by other antimicrobial stewardship programs and pharmacy departments. During these challenging times, it is imperative to engage in multidisciplinary collaboration to not only keep the patient safe but our own colleagues as well. We hope our project inspires other creative ways for antimicrobial stewardship programs to contribute to efforts to prevent HCW exposure to SARS-CoV-2.

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Examining the need for eye protection for coronavirus disease 2019 (COVID-19) prevention in the community

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To the Editor—As the world reopens after extreme social distancing designed to flatten the curve and protect hospitals, it appears that even countries that had controlled coronavirus disease 2019 (COVID-19) with widespread testing and contact tracing, such as South Korea and Singapore, are seeing increased case counts. One proposed method for reducing transmission as society reopens is requiring the public to wear face coverings, including cotton face masks or face shields.[1] An important factor that distinguishes face shields from masks is eye protection. Yet the importance of eye protection in the prevention of COVID-19 and other coronaviruses is underappreciated, which has led to public health authorities recommending cotton face masks over potentially more protective alternatives, such as face shields.

The mucous membranes of healthcare workers (HCWs), including the conjunctiva, may be exposed to respiratory droplets from the patient.[2] The importance of eye protection during care of patients with novel coronaviruses was recognized in 2003 during the severe acute respiratory syndrome coronavirus (SARS-CoV-1) outbreaks and subsequent Middle East respiratory syndrome coronavirus (MERS-CoV) outbreaks.[3] For example, during SARS, the lack of eye protection when transferring a patient may have been the primary risk factor for one of the first doctors infected.[4]

It has been increasingly recognized that severe acute respiratory coronavirus virus 2 (SARS-CoV-2) can be transmitted from infected individuals when they are asymptomatic or presymptomatic.[3,5] Thus, to prevent transmission in the community, personal protective equipment (PPE) must be worn at all times in addition to other containment measures such as 2 m (6 feet) distancing and avoiding large gatherings. Both droplet and contact transmission routes have been implicated in the spread of SARS-CoV-2.[1,3] PPE has 2 potential benefits when worn in the community: (1) PPE can provide source control by containing the respiratory droplets generated through coughs, sneezes or during speech and (2) PPE can act as a barrier preventing respiratory droplets from landing on facial mucosal membranes or other parts of the face. Additionally, PPE can prevent contact transmission by preventing contaminated hands from reaching the mucosal membranes of the mouth, nose and eyes.

Eye protection might provide additional benefits. A detailed investigation of risk factors for HCW acquisition of SARS, including multivariate generalized estimating equation logistic regression models, identified unprotected eye contact with body fluids as an independent risk factor for infection (odds ratio [OR], 7.34; $P = .001$).[6] However, in a survey of 8 of the 9 US healthcare facilities in which SARS-CoV-1–infected patients were evaluated, 70% of HCWs reported some exposure to patients without wearing some level of eye protection and none acquired infection.[7]

Although conjunctivitis has been described in a few patients with COVID-19 and other coronavirus syndromes,[5] emerging evidence supports that coronavirus can enter the host via the conjunctival route.[8] Conjunctiva may be a potential portal for infection[9] because it is directly exposed to extraocular pathogens, and the mucosa of the ocular surface and upper respiratory tract are connected by the nasolacrimal duct and have been shown to

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