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Application of the Centers for Disease Control and Prevention's Isolation Directives for Patients Exposed to Severe Acute Respiratory Syndrome Coronavirus 2

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A B S T R A C T

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Severe acute respiratory syndrome coronavirus 2 infection and coronavirus disease 2019 (COVID-19) remain an ongoing public health concern. Although directives are subject to change, nurse practitioners must have a strong working knowledge of COVID-19 precaution and isolation directives to counsel patients on proper implementation of precaution and isolation strategies. This article informs clinicians regarding some input that informs the Centers for Disease Control and Prevention's COVID-19 isolation directives, provides a review of the most recent directives to symptomatic and asymptomatic patients testing positive for severe acute respiratory syndrome coronavirus 2, discusses the use of the Centers for Disease Control and Prevention's COVID-19 Isolation and Exposure Calculator; and examines the NP's role in guiding future research and public health initiatives.

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Infection with the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) virus and consequential coronavirus disease 2019 (COVID-19) was first identified as a major global public health concern and pandemic by the World Health Organization in March of 2020.¹ The prevalence of vaccine-mediated and natural immunity in the United States has resulted in less acute COVID-19 disease than during the initial phases of the pandemic. The Centers for Disease Control and Prevention (CDC) data reflect a peak number of 25,974 deaths during the week ending on January 9, 2021.² This can be contrasted with 727 deaths reported for the week ending on December 2, 2023.² Downward trends in COVID-19 since the peak of the pandemic are also mirrored in new hospital admission rates and emergency department visits.^{3,4}

Although these data are overwhelmingly positive and indicate significant progress in reducing morbidity and mortality associated with COVID-19, it remains a major public health threat and leading cause of death in the United States.⁵ The initiation of effective isolation procedures is vital to stopping person-to-person communication of SARS-CoV-2; however, clinicians can find the directives advanced by the CDC to be confusing and counterproductive.⁶ For example, 1 reason cited for this is the omission of the need for a negative test before ending isolation.⁶

The purpose of this article is to help define these directives by providing a closer analysis of the clinical input that informs COVID-19 CDC precautions and isolation directives, to provide guidance on how nurse practitioners (NPs) and other clinicians can apply the

most recent directives to both symptomatic and asymptomatic patients who test positive, and to discuss the use of the CDC COVID-19 Isolation and Exposure Calculator. Finally, advice regarding future research and public health initiatives aimed at reducing propagation of SARS-CoV-2 and the associated COVID-19 through effective precautions and isolation directives is provided.

Clinical Input That Informs CDC Isolation Directives

The major components of isolation directives to those exposed to SARS-CoV-2 provided by the CDC include isolation, masking, and avoiding contact with individuals who are at higher risk for complicated morbidity and mortality.⁷ It is also imperative to consider that "This CDC guidance is meant to support—not replace—any federal, state, local, territorial, or tribal health and safety laws, rules, and regulations."⁷

This suggests that although the CDC directives are evidence based and effective, they are not meant to circumvent policies that might be enacted as more appropriate for certain geographic or clinical environments. For example, decision support tools can be beneficial when geographic trends or historical data indicate the need for using alternative approaches to lockdowns or protective measures.⁸ Hospital admission rates do not play a role in shaping the CDC's directives on precautions and isolation.⁷

In addition, the CDC has different directions for those persons exposed to SARS-CoV-2 who test positive but remain asymptomatic

Table 1
Precautions Recommended for Patients in Isolation⁷

- Wear a high-quality^a mask if the patient must be around other individuals while in the home or in public.
- Do not travel. When travel is unavoidable, the patient should only travel to those locations where a high-quality mask can be worn.
- Stay at home and separate from others.
- Designate a bathroom specifically for the patient infected and ensure he/she/they uses this bathroom only.
- Improve ventilation in the home.¹⁰
 - Open windows to bring in optimal fresh air.
 - Change air filters in heating, ventilation, and air conditioning systems, using only those that fit appropriately.
 - Utilize portable high-efficiency air cleaners.
 - Turn on exhaust fans and other fans in the home to improve airflow.
 - Switch air-conditioning unit control from “Auto” to “On” to promote continuous airflow and filtration.
- Refrain from sharing drinking and eating utensils and towels.

^a Masks that meet standard provide a proper fit over the patient’s nose and mouth, have multiple layers of nonwoven material, include a nose wire, are dry, and do not cause dyspnea when used per manufacturer’s instructions.¹¹

versus those who have been exposed to SARS-CoV-2 and test positive but go on to develop symptoms of COVID-19 disease. In symptomatic patients who test positive, day 0 of isolation is the day in which the patient first has/had symptoms, whereas day 1 is the first full day after the day the patient’s symptoms started (day 0).⁷

In those who test positive but are asymptomatic, day 0 is the day the patient was tested, whereas day 1 is the first full day following the day the patient was tested (day 0). If these patients become symptomatic within 10 days of day 0, a new day 0 is assigned, which becomes this new day of initial symptom onset.⁷ These day count concepts are imperative when applying the CDC’s directives for precautions and isolation.

CDC’s COVID-19 Directives: Precautions and Isolation

The CDC’s directives related to COVID-19 precautions and isolation include guidance for patients who test positive and have symptoms and those who test positive but are asymptomatic. Because patients are most communicable within the first 5 days of infection, they should be advised to stay at home and isolate from others in the home for at least 5 days.⁷ Additional precautions also recommended by the CDC during this time are presented in [Table 1](#). Data presented in this table might also be helpful in designing patient education pamphlets and other interventions aimed at outlining best practices for patients to implement while in isolation. Finally, patients should be educated to self-monitor for complications that may signify an emergency including shortness of breath or dyspnea; chest pain; changes in mentation; extreme fatigue and/or difficulty in staying awake; or cyanosis to the integument, lips, or nail beds.⁹ These patients should immediately seek emergency care.⁹

Patients who tested positive but remained asymptomatic may end isolation after day 5. Symptomatic patients who tested positive can conclude isolation at day 5 if symptoms are improving and the patient has remained afebrile for 24 hours without the use of antipyretics.⁷ Symptomatic patients without improvement should continue to isolate until symptoms improve and they remain afebrile for 24 hours without the use of antipyretics.⁷ Patients with moderate disease, marked by shortness of breath or dyspnea not requiring hospitalization, should isolate through day 10.

Symptomatic patients who required hospitalization or who are immunocompromised should isolate through day 10 or longer depending on the advice of their providers and may need additional viral testing.⁷ Regardless of when isolation ended, through day 11, these patients should be instructed to avoid contact with

persons at higher risk of morbidity and mortality from COVID-19 disease and continue to wear a high-quality mask when indoors around others or in public.⁷ These recommendations are summarized in [Table 2](#).

Because some NPs and other clinicians may find these directives confusing and challenging to apply in the clinical setting, clinical decision tools exist to assist the clinician in providing isolation guidance to their patients. One such tool is the CDC’s COVID-19 Isolation and Exposure Calculator.⁷

CDC’s COVID-19 Isolation and Exposure Calculator

According to the CDC, the purpose of the COVID-19 Isolation and Exposure Calculator is as follows:

[To help] people know what to do if they have COVID-19 or have been exposed to someone with COVID-19. People with COVID-19 who have mild symptoms or no symptoms will know how long they need to stay home and away from other people (isolate). People who were exposed to someone with COVID-19 will know how to take steps, like getting tested, and for how long they should wear a high-quality mask (para. 3).⁷

The CDC’s COVID-19 Isolation and Exposure Calculator can be found by accessing the CDC Isolation and Precautions for People with COVID-19 website⁷ and clicking the “Isolation and Exposure Calculator” button found in the website’s first textbox. Once the user clicks on this, a new desktop window will open that enables the tool. Users can select “Tested positive for COVID-19 or have symptoms” or “Been exposed to someone with COVID-19.” After the selection of 1 of these options, the user is guided through a series of questions that ultimately yield a comprehensive recommendation regarding precautions and isolation. An example of the use of the calculator is presented in [Table 3](#).

Of significance, the calculator is not designed for use in computing isolation times for people who are moderately or severely ill, those who are immunocompromised, health care workers, or those working or living in high-risk congregate settings.⁷ The use of this tool might ease the anxiety some clinicians

Table 2

Summary of Isolation Procedures for Patients Exposed to Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2)^{7,9}

- All patients exposed to SARS-CoV-2 should be advised to stay at home and isolate from others in the home for at least 5 days.
- Asymptomatic patients who test positive
 - May end isolation after day 5.
 - Should self-monitor for SOB or dyspnea; chest pain; changes in mentation; extreme fatigue and/or difficulty in staying awake; or cyanosis to the integument, lips, or nail beds and seek emergency care if occurs.
- Symptomatic patients
 - Can conclude isolation at day 5 if symptoms are improving and the patient has remained afebrile for 24 hours without the use of antipyretics.
 - Patients without improvement
 - Continue to isolate until symptoms improve and remain afebrile for 24 hours without antipyretics.
 - Patients with moderate disease (marked by SOB or dyspnea not requiring hospitalization)
 - Isolate through day 10.
 - Those who required hospitalization or are immunocompromised
 - Isolate through day 10 or longer depending on the advice of their providers.
 - May need additional viral testing.
 - Regardless of when isolation ended, through day 11, these patients should
 - Avoid contact with persons at higher risk of morbidity and mortality from COVID-19 disease.
 - Continue to wear a high-quality mask when indoors around others or in public.

SOB = shortness of breath.

Table 3Application of the Centers for Disease Control and Prevention's Coronavirus Disease 2019 (COVID-19) Isolation and Exposure Calculator⁷

- On October 1, 2023, a patient presents to the NP complaining of mild cough and congestion that began 48 hours ago.
 - The patient is afebrile and denies history of fever but has a positive SARS-CoV-2 screening test.
- The patient asks the NP how long it will be necessary to follow recommended precautions and isolation directives.
- The NP accesses the Centers for Disease Control and Prevention's COVID-19 Isolation and Exposure Calculator to advise the patient on the following questions:
 - First, the NP selects the "Tested positive for COVID-19 or have symptoms" option in the calculator.
 - Next, the NP is asked to select an option: "Regardless of your vaccination status, select the option that best describes your current situation: No symptoms or Have symptoms." The NP selects "Have symptoms."
 - The next prompt states, "You have symptoms—even if you are awaiting test results or have not been tested. Enter date when symptoms began (mm/dd/yyyy):"
 - The NP enters "09/30/23."
 - The next prompt asks, "Do you have a fever?" Options include: "Yes," "No," or "I have a fever now." Because the patient has been afebrile, the NP selects, "No."
- These answers then culminate in clinical recommendations that indicate the patient can leave the home on October 10, 2023.
- In addition, recommendations regarding masking and cessation of isolation are provided.
- Additional answer texts can be elicited by selecting the questions "What to do for isolation?" "What if I still have symptoms?" "What if I was moderately or severely ill?" and/or "What type of mask should I wear?" Another option is "More information about COVID-19" that can be selected for additional information COVID-19 disease and treatment.

NP = nurse practitioner; SARS-CoV-2 = severe acute respiratory syndrome coronavirus 2.

experience because of the complexity of precaution and isolation directives. It can also improve the public's health by facilitating proper precaution and isolation directions aimed at limiting opportunity for the transmission of SARS-CoV-2 to others. Conducting educational workshops or using simulation in clinical practices might be effective at familiarizing NPs on the tool and its use. These types of activities might be particularly important for new staff or those without experience in the clinical application of the calculator.

Conclusion: Future Directives for NPs, Clinicians, Educators, and Researchers

NPs and other clinicians working with patients exposed to SARS-CoV-2 play a major role in helping protect the public from further propagation of infection and preventing infection in those at most risk for moderate and severe illness who are also at risk for major consequential morbidity and mortality. There are multiple stories of success when clinicians adhere to effective isolation precautions and use innovative infection control strategies in their clinical settings.¹² For example, 1 long-term care facility in Massachusetts was met with overwhelming support when it used its website and social media presence, recorded phone messages, and voicemails to communicate aggregate infection rates to families of residents.¹²

NPs can also optimize electronic medical record (EMR) systems to be more adaptive and responsive for care of patients exposed to SARS-CoV-2 and with COVID-19. The EMR provides patient tracking solutions, templates, and workflows for clinicians. These can be tailored to meet the unique needs of managing the changing requirements of, and ongoing interpretation of, CDC recommendations, as well as tracking the course of SARS-CoV-2 and COVID-19. EMRs contain data that can be harvested to monitor patient compliance including the number of cases of SARS-CoV-2 and COVID-19. If these numbers increase or decrease, the NP can begin to investigate, identify, and track etiologic sources for these trends. This facilitates NP practice improvement and can help them contribute to practice scholarship.

Although this article provided comprehensive details regarding the CDC's directives⁷ for precautions and isolation in those exposed to SARS-CoV-2 without symptoms and those with mild, moderate, and severe COVID-19 disease, NPs and other care providers must continually appraise the literature on the topic to properly implement evidence-based precautions and isolation strategies. The use of clinical decision-making tools, such as the CDC's COVID-19 Isolation and Exposure Calculator, is also an approach clinicians can use to reduce clinical-decision making

anxiety and provide appropriate precautions and isolation directions for patients.

Comprehending infection control from a micro- and macro-systems approach is also salient for NPs and other clinicians working with patients exposed to SARS-CoV-2. The World Health Organization authors a comprehensive resource entitled *Infection Prevention and Control in the Context of COVID-19: A Guideline*¹³ that was recently updated on December 21, 2023. This publication provides "technical guidance developed and published during the COVID-19 pandemic into evidence-informed recommendations for infection prevention and control (IPC)" (para 1).¹³ It is available both online and as a PDF.¹³ Recommendations for infection control inclusive of health care settings; patients with suspected or confirmed COVID-19; water, sanitation, hygiene, and waste management; special settings (eg, home and long-term care settings); and mitigation measures in the community (including outbreak preparedness and response) are provided in this resource.¹³

NPs and NP educators should also be aware of the dynamic nature of clinical guidelines related to these concepts. Because infection rates and evidence-based infection control strategies change, NPs should maintain currency regarding these concepts. Of significance, the CDC resources provided in this article are updated on a regular and ongoing basis and can be helpful resources for NPs.

Graduate NP learners should have an awareness of how resources can be accessed and how to apply these resources clinically to best prevent the spread of SARS-CoV-2 and subsequent COVID-19 disease. Simulation could be 1 modality NP educators can use to provide these skills because it has been successfully used to teach COVID-19 screening and care concepts to health care workers.¹⁴ Finally, nurse scientists should continue to work toward the identification of evidence-based mechanisms to provide optimal guidance related to precautions and isolation in asymptomatic patients exposed to SARS-CoV-2 and those who develop mild, moderate, and severe COVID-19 disease.

Expanding the scientific knowledge of how SARS-CoV-2 is best transmitted and how this transmission can be optimally reduced could translate to best practices across all health care settings. Scholars have suggested the pandemic has highlighted the potential for improvement in future infection control mechanisms related to 1) preparedness and surveillance, 2) awareness and education, 3) technological advancements, 4) global collaboration, 5) research and innovation, and 6) cultivation of collaboration.¹⁵ NPs can participate across the clinical, education, and research spectrum and contribute greatly to the public's health by reducing the spread of SARS-CoV-2 and helping those experiencing COVID-19 disease have the best possible outcomes.

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Christopher W. Blackwell: Writing – original draft, Visualization, Validation, Supervision, Software, Resources, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization.

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