

Focused Review

Ohio Response to COVID-19 and Its Impact on Interventional Pain Management Practices

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Background: The coronavirus disease 2019 (COVID-19) pandemic has drastically altered daily living and medical care for Ohio residents and the practice of medicine for the interventional pain management physician. As a state, Ohio tends to be demographically representative of the broader US population.

Objective: Reviewing the efforts deployed by Ohio to flatten the COVID-19 infection curve and reduce the spread of the novel severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is an important component of determining optimal procedures for mitigating the effects of the COVID-19 pandemic.

Methods: Over the course of several announcements and orders during the months of March and April, new policies were put into place to prevent COVID-19 transmission, which included efforts to facilitate social distancing and ensure the health care system could manage the number of COVID-19 cases at peak infection rate. Efforts directed toward medical providers included delay of elective procedures, expansion of telehealth options, and new temporary guidance for prescribing controlled substances.

Results: The Ohio COVID-19 containment approach resulted in a substantial reduction in COVID-19 cases compared with early models of disease spread, and the state has begun a phased reopening. Continued vigilance in applying social distancing and infection control measures will be a critical component of preventing or reducing the impact of a second wave of COVID-19 in Ohio.

Limitations: A narrative review with paucity of literature.

Key words: COVID-19, infection rates, mitigating effects, pandemic, infection control

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Coronavirus disease 2019 (COVID-19) is an infectious disease caused by the novel severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). SARS-CoV-2 is believed to have originated in a live market in Wuhan, China, before it spread across the globe via human-to-human transmission (1). On March 11, 2020, the World Health Organization (WHO) declared that COVID-19 fit the criteria for a pandemic (2).

COVID-19 has a highly heterogeneous presentation. Symptoms can be respiratory (e.g., cough, dys-

pnea) or systemic (e.g., dizziness, weakness, nausea/vomiting), and 18% to 43% of infected people have no symptoms at all (3,4). The lack of symptoms is especially troubling given the well-documented presymptomatic and asymptomatic transmission potential of SARS-CoV-2 (5-7), which can make case isolation challenging, leading to more infections and deaths. The estimated mortality rate of COVID-19 has ranged from 1.3% to 15.2%, with higher rates of mortality in older populations and those with comorbid conditions (8,9).

As of May 2020, forecasts suggest that the COVID-19 epidemic is increasing in magnitude in the United States (10). Current models predict that, by August 2020, confirmed COVID-19 cases will reach about 2 million, and deaths will total between 130,000 and 190,000 (11-13). However, models for infection are continuously being updated as public health measures are implemented to slow the spread of SARS-CoV-2 (14,15). Across the United States, governments at various levels have adopted unprecedented social and health care policies, which have included widespread isolation, quarantine, and social distancing measures. The speed and efficiency with which cities, states, and countries enacted such measures may have long-term impacts on the ultimate number of COVID-19 cases, hospitalizations, and fatalities. For example, preemptive travel restrictions and orders that facilitated social distancing were associated with reductions in COVID-19 spread in China (16,17).

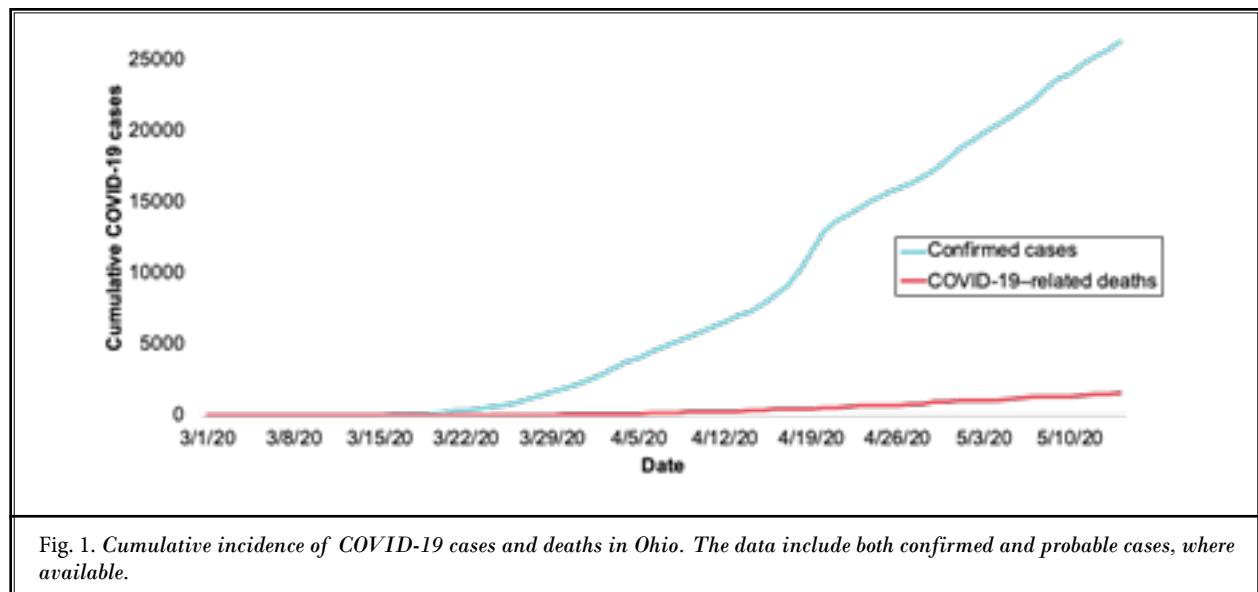
In Ohio, several preemptive measures were undertaken in early March to reduce transmission and spread of COVID-19. These orders included school closures, restrictions on mass gatherings, and delays in preventive and elective surgeries (18). Reviewing these measures and their effects on the Ohio COVID-19 infection rate could be beneficial for evaluating the effectiveness of community responses to COVID-19. Ohio demographics closely resemble those of the United States in terms of age, sex, race/ethnicity, economy, employment, and rural/urban spread (19). Indeed, Ohio's representative demographics

have been one feature that underlies the state's consistent status as a "swing state" in national elections, with voting results that closely resemble the US national average (20). In this article, we will review Ohio's response to COVID-19 and the potential effects it had on COVID-19 spread as well as the wider medical community, including interventional pain practices.

METHODS

Information about Ohio's response to COVID-19 and the attendant effects of this response were gathered from a variety of sources. A literature search was conducted to identify peer-reviewed journal articles. In addition to a search of the standard outlets (i.e., PubMed, Embase), prepublication databases (i.e., bioRxiv, medRxiv), websites of public health organizations, and governmental agency websites were also searched due to the rapidly evolving nature of the COVID-19 field. A search of Ohio-specific websites included those of the State Medical Board of Ohio, State of Ohio Board of Pharmacy, Ohio Department of Health (ODH), Ohio Hospital Association, and local media outlets.

Once relevant sources were identified, the governmental responses to COVID-19 were mapped out, and the potential impacts on COVID-19 transmission, health care resource use, and mortality were qualitatively evaluated. The impact of Ohio orders on medical practitioners who provide essential or nonessential services was also qualitatively reviewed.



DISCUSSION

The first 3 confirmed COVID-19 cases in Ohio were diagnosed on March 9, 2020, which was immediately followed by a declaration of a state of emergency. Although these 3 cases were the first confirmed by antigen testing, antibody testing has since revealed that COVID-19 may have been in Ohio as early as January 7, 2020 (21). Since the initial identification of COVID-19 in Ohio in early March, the incidence of COVID-19 has steadily risen in the state, as has the associated number of deaths (Fig. 1). The first confirmed coronavirus death in Ohio was reported on March 20, 2020, and more than 1500 Ohioans have now died as a result of COVID-19 or its complications (22).

Ohio Social Distancing Measures

In the days following the state of emergency declaration in Ohio, several steps were taken to encourage social distancing (Fig. 2). Within the first week, visitors were banned from nursing homes, prisons, jails, and corrections centers; schools were closed; indoor recreational facilities (e.g., fitness centers, movie theaters, and bowling alleys) were closed; restaurant dining rooms were closed while takeout remained open; and mass gathering sizes were restricted (18). On March 22, 2020, a stay-at-home order was enacted and was then extended to early May, at which point Ohio's Responsible RestartOhio initiative was unveiled to begin the process of reopening businesses and health care facilities (23)

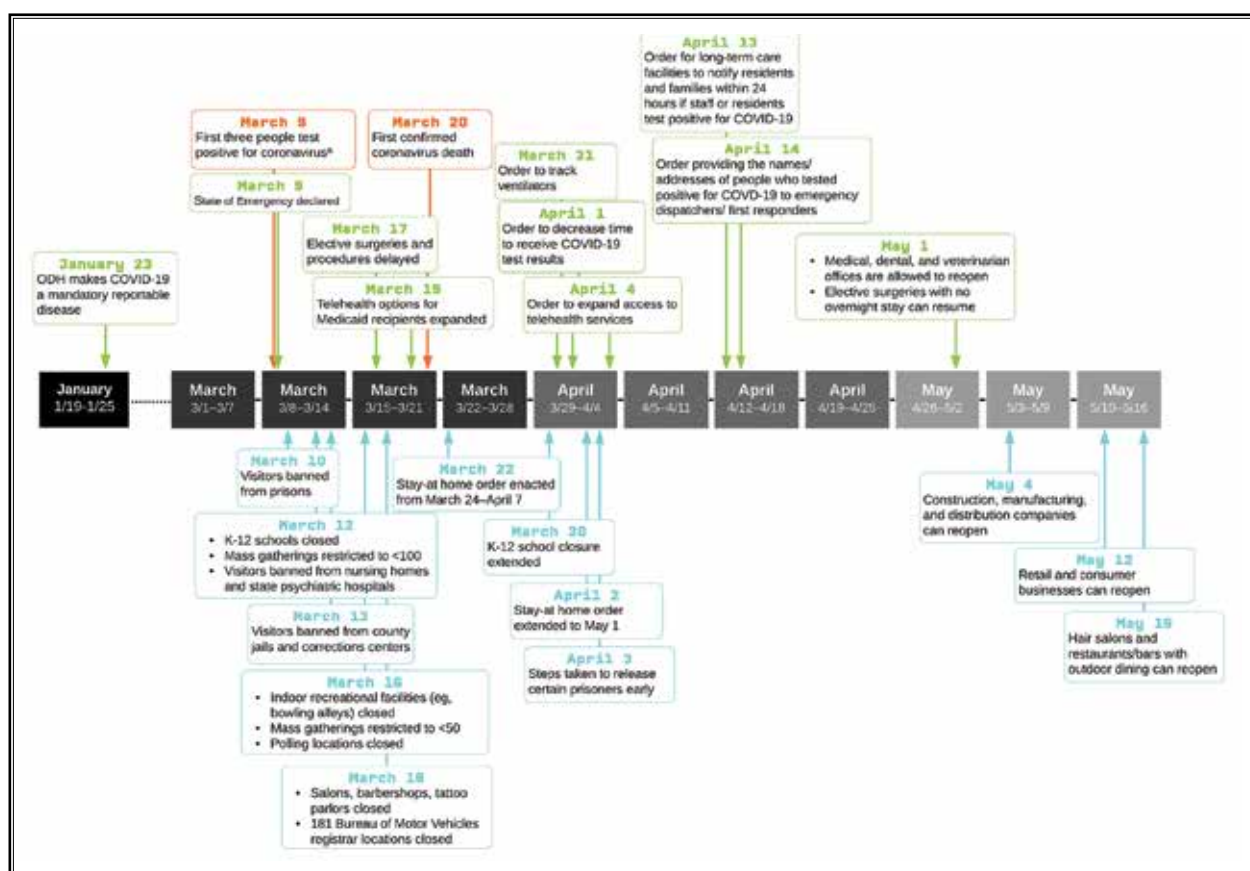


Fig. 2. Timeline of Ohio announcements and orders to contain COVID-19 and slow the spread of the virus. Announcements and orders developed and enacted by Governor Mike DeWine and Ohio Department of Health Director Amy Acton, MD, MPH. Announcements and orders included those related to social distancing (blue), medical preparedness (green), and COVID-19 itself (orange).

Abbreviations: COVID-19, coronavirus disease 2019; K-12, kindergarten to first grade; ODH, Ohio Department of Health.

aAlthough the first 3 positive tests for COVID-19 occurred March 9th, subsequent antibody testing revealed that COVID-19 may have been in Ohio as early as January 7th.

Ohio Medical and Health Care Orders

In addition to the extensive social distancing and isolation measures that were instituted, Governor Mike DeWine and ODH Director, Amy Acton, MD, MPH, worked together to develop health care policies that would both prevent the spread of COVID-19 and improve Ohio's capacity for personal protective equipment (PPE), ventilatory support, and continued care for acute and chronic conditions unrelated to COVID-19 (18).

One of the first health care-directed responses to COVID-19—and one that directly impacts the interventional pain provider—was the delay of elective surgeries, which was instituted on March 17, 2020. Nonessential surgeries were defined by the ODH as surgeries that “can be delayed without undue risk to the current or future health of a patient.” Examples provided of criteria to consider when classifying a surgery as essential included life-threatening conditions, threat of permanent dysfunction of an extremity or organ, risk of cancer metastasis or stage progression, or time-sensitive risk of worsening to severe symptoms (24). Additional clarification of nonessential procedures was published on April 8, 2020, in the form of a checklist, which stated that an essential surgery was one that saves a life, manages a severe disease, and/or avoids further harm from an underlying condition (25).

Under these definitions, most chronic pain procedures would be considered elective and thus nonessential. A small number of procedures, such as refill or adjustment of an implantable device, would be clear essential surgeries. However, a subset of pain procedures may require more careful consideration when determining whether they would be essential or nonessential in the current climate of the COVID-19 pandemic. For example, the management of severe and intractable cancer pain caused by bone or central nervous system metastases might be considered a procedure that manages a severe disease (25).

The expansion of telehealth options is another COVID-19 containment strategy that has both mitigated COVID-19 spread and also impacted the practices of pain clinicians. On March 9, 2020, the Ohio State Medical Board indicated that it would not enforce in-person visit requirements during the COVID-19 pandemic and that telemedicine should be used to replace in-person visits when possible (26). Furthermore, on March 19, 2020, DeWine signed an executive order that expanded access to telehealth

for mental and behavioral health services among Medicaid enrollees (27). Later, DeWine further expanded the telehealth waiver to apply to services from individual counselors, social workers, and marriage and family counselors (28). The expansion of telehealth improves social distancing for both patients and providers while also allowing for continuity of care, which has been shown to be important for optimizing pain patients' satisfaction levels and outcomes.

The relaxation of telehealth requirements is particularly important to the pain provider. Restrictions normally limit telehealth prescribing of controlled substances, prescribing for subacute and chronic pain, pain management, medical marijuana recommendations and renewals, and opioid use disorder management (26). Under the telehealth waivers, pain physicians may now prescribe controlled substances through telemedicine for the duration of the US public health emergency. Prescribing a controlled substance via telemedicine does require the use of an audiovisual, real-time 2-way interactive communication system (26,29). To deliver prescriptions for controlled substances to a pharmacy, prescribers can issue the prescription electronically (schedules II-V) or call the pharmacy directly (emergency schedule II and schedules III-V) (30). Taken together, the moratorium on interventional procedures and the shift toward telehealth for nonemergent conditions has changed the interventional pain practice in both Ohio and across the United States, with many practices limiting hours or temporarily closing their doors entirely.

Another health care policy that has affected the pain clinician during the COVID-19 pandemic is the requirement for ventilator inventory reporting, which was first enacted on March 31, 2020. All physicians and clinics, along with ventilator distributors and retailers, were required to report and disclose their ventilator inventory to the ODH each week (31). Pain management physicians who provided site-of-service injections or procedures or who owned their own ambulatory surgery centers were included in this order and required to inventory and report their ventilator supplies.

ODH Reporting Requirements

On April 14, 2020, Acton signed an order that allowed the release of protected health information for individuals who tested positive for COVID-19 to Ohio's first responders and dispatchers. The order

required that local health departments provide the names and addresses of people who tested positive for COVID-19 to the local dispatch agency or agencies. The information would only be released to first responders who are responding or may be called upon to respond. The goal of this order was to prevent the spread of COVID-19 during interactions with first responders, who are at great risk for both contracting COVID-19 and spreading it to other people (32).

Successes & Future Challenges in Ohio During the COVID-19 Pandemic

In the absence of any social distancing efforts, COVID-19 cases in Ohio were projected to peak at 62,000 new cases per day. On April 3, 2020, DeWine said that Ohio models suggested peak COVID-19 cases would not occur until mid-June, with the potential for between 6,000 and 10,000 new cases per day (33). However, more recent models that better account for the successes of Ohio policies indicate that the peak may have already occurred in mid-April, at 1,380 new cases in a single day (Fig. 3) (34). These data suggest that Ohio may have successfully flattened the curve through the use of preemptive measures focused on

improving social distancing and optimizing health care procedures and resources.

Ohio is now in the process of reopening businesses and prioritizing procedures and interventions that were previously delayed. On April 22, 2020, Acton and DeWine asked hospital and ambulatory providers to reevaluate procedures that were delayed due to the COVID-19 pandemic. Prior to discussing surgery with patients, providers were instructed to ensure adequate supply of PPE and other equipment, ensure adequate testing capability in the community for patients and staff, and implement infection control and mitigation strategies. Once facilities were prepared, health care providers were advised to begin to contact patients to discuss surgical options. Considerations for determining whether to perform an intervention or continue to delay include patient health status and quality of life as well as the risk to the patient of contracting COVID-19. Clinicians have also been encouraged to give careful consideration to nonsurgical options, when appropriate (35). Beginning May 1, 2020, all medically necessary procedures not requiring an overnight stay in a health care facility could resume. Other sectors and businesses have

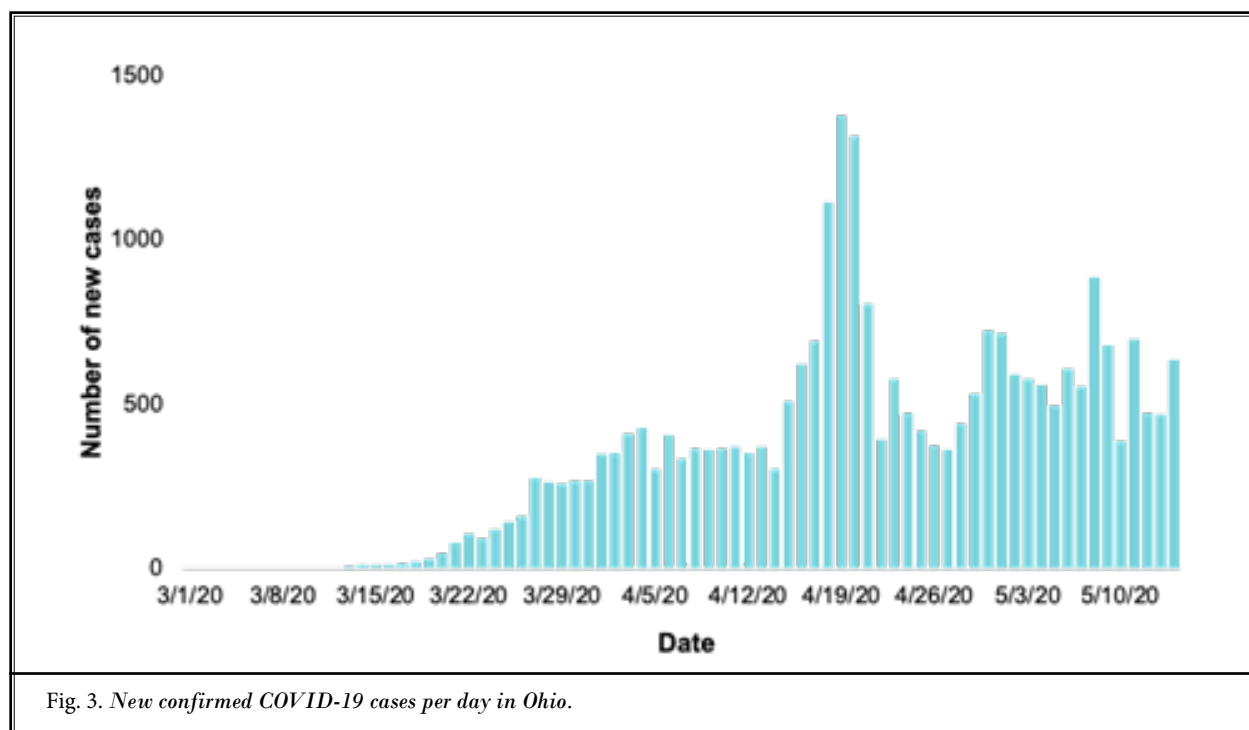


Fig. 3. New confirmed COVID-19 cases per day in Ohio.

been or will be phased back in through the months of May and June (36).

Although Ohio's preemptive policies flattened the curve of COVID-19 cases, COVID-19 is expected to persist in the community for the foreseeable future until an effective vaccine has been developed. Experts have warned about a so-called second wave of COVID-19, which could be caused by prematurely relaxing social distancing interventions (37,38). Continued efforts to prevent a resurgence of COVID-19 infections in Ohio will be critical to maintaining early gains in bending the curve. Ohio's stay-at-home order was left in place to encourage social distancing, and large gatherings of more than 10 people are still prohibited (36); however, additional mitigation efforts will likely be needed.

A key component of reducing transmission is shortening the time between acquiring an infection and initiating social isolation. Widespread access to COVID-19 testing, robust contact tracing, and improved monitoring for early symptoms (e.g., temperature or symptom screening) are components of COVID-19 programs that were shown to be beneficial in mitigating COVID-19 spread in China and South Korea (37,38). In one study, case isolation and contact tracing were expected to control a COVID-19 outbreak within 3 months; however, long delays from symptom onset to isolation decreased the likelihood of outbreak control (39). Other important public health efforts include handwashing, wearing a cloth face mask, and covering the mouth and nose when sneezing.

For medical providers, ongoing efforts will be needed to continue to flatten the curve. Telehealth will likely be a critical component of medical care for the foreseeable future; however, implications for pain providers are less clear. Pain providers can only prescribe controlled substances via telemedicine through the duration of the public health emergency. Therefore, it's possible that pain providers will be required to transition back to the clinic before other clinicians. At that time, providers will need to be prepared to implement infection control measures to keep both patients and health care personnel safe. Similarly, for providers who are currently performing interventional pain procedures, infection control measures will be critically important.

Interventional pain providers are not only met with the challenges of infection control and social distancing, they must also devote resources toward triaging the backlog of procedures and surgeries due to the postponement. Furthermore, in the case of a second

wave of infection, providers should be prepared to scale back operations. Fortunately, as health care providers in a field that has rapidly changed in recent decades, pain providers are adaptable and well prepared to meet the challenges of practicing medicine during this unprecedented pandemic.

Prisoner Facility Testing

Ohio was the first state to test whole prison facilities. Out of a concern for prisoners at risk for worse outcomes should they contract the coronavirus and develop COVID-19, Ohio chose 3 prisons to test due to their having an older and sicker population. They were Marion Correctional Institution, Pickaway Correctional Institution, and Franklin Medical Center. The entire prisoner and staff populations were tested (40). Testing was also carried out at other facilities but only of symptomatic patients or cases of possible exposure. As of May 16, 2020, the Ohio COVID-19 Inmate Testing data showed that a total of 7,923 individuals were tested for the coronavirus and 4,505 were positive for a prevalence rate of 57%. There were 62 confirmed and probable deaths from COVID-19 (41). Interestingly, at the time of testing, a majority of those testing positive were asymptomatic. These results show that in the general population, a large number of people infected with coronavirus will be asymptomatic. This illustrates the need for widespread coronavirus testing of asymptomatic populations to better understand the prevalence in the general population.

Second Wave Prevention

Ohio has taken a number of steps to prevent a potential second wave. Currently, businesses are encouraged to check for symptoms of COVID-19 as well as assess for recent travel or contact with someone who has COVID-19. Applying social distancing and encouraging the use of masks are also suggested for Ohio businesses and citizens. Additionally, Ohio has taken stock of available ventilators throughout the state and has come up with a plan to redeploy these as needed. Ohio has also secured an adequate supply of PPE as well as come up with a way to rapidly sterilize N95 masks. Additionally, each major city in Ohio has come up with a plan to create a temporary hospital for excess overflow should the state become overwhelmed.

CONCLUSIONS

Through the use of preemptive measures, Ohio successfully flattened the curve and reduced the spread

of COVID-19 in the state, resulting in a presumptive peak in mid-April. Measures implemented to reduce COVID-19 transmission include social distancing orders and policies intended to conserve health care resources. Elective surgeries were postponed for more than a month to conserve PPE, and telehealth prescribing options were expanded for controlled substances, which are essential for many patients experiencing chronic pain. Over the coming months, it is possible that necessity will lead to new innovations in telemedicine, and the ways in which those will be translated to pain practice remains to be seen. Until such time that a vaccine is developed, medical practices should continue to remain cautious, with heightened attention toward handwashing, social distancing, assessing for temperature, and symptom screening.

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REFERENCES

1. Li Q, Guan X, Wu P, et al. Early Transmission Dynamics in Wuhan, China, of Novel Coronavirus-Infected Pneumonia. *N Engl J Med* 2020;382:1199-1207.
2. World Health Organization. Coronavirus disease 2019 (COVID-19) Situation Report – 51. March 11, 2020. <https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200311-sitrep-51-covid-19.pdf>
3. Mizumoto K, Kagaya K, Zarebski A, et al. Estimating the asymptomatic proportion of coronavirus disease 2019 (COVID-19) cases on board the Diamond Princess cruise ship, Yokohama, Japan, 2020. *Euro Surveill* 2020;25.
4. Gudbjartsson DF, Helgason A, Jonsson H, et al. Spread of SARS-CoV-2 in the Icelandic Population. *N Engl J Med* April 14, 2020. [Epub ahead of print].
5. Kimball A, Hatfield KM, Arons M, et al. Asymptomatic and Presymptomatic SARS-CoV-2 Infections in Residents of a Long-Term Care Skilled Nursing Facility - King County, Washington, March 2020. *MMWR Morb Mortal Wkly Rep* 2020;69:377-381.
6. Arons MM, Hatfield KM, Reddy SC, et al. Presymptomatic SARS-CoV-2 Infections and Transmission in a Skilled Nursing Facility. *N Engl J Med* April 24, 2020. [Epub ahead of print].
7. Wei WE, Li Z, Chiew CJ, et al. Presymptomatic Transmission of SARS-CoV-2 - Singapore, January 23-March 16, 2020. *MMWR Morb Mortal Wkly Rep* 2020;69:411-415.
8. Basu A. Estimating The Infection Fatality Rate Among Symptomatic COVID-19 Cases In The United States. *Health Aff (Millwood)* May 7, 2020. [Epub ahead of print].
9. Baud D, Qi X, Nielsen-Saines K, et al. Real estimates of mortality following COVID-19 infection. *The Lancet Infectious diseases* 2020: S1473-3099(1420)30195-X.
10. Imperial College COVID-19 response team. Short-term forecasts of COVID-19 deaths in multiple countries. <https://mrc-ide.github.io/covid19-short-term-forecasts/index.html> Accessed May 13, 2020.
11. Gu Y. United States. COVID-19 Projections. <https://covid19-projections.com/us> Accessed May 13, 2020.
12. Gu Q, Xu P, Chen J, et al. COVID-19 Cases in the World. *UCLA Comating COVID-19*. <https://covid19.uclaml.org/> Accessed May 13, 2020.
13. COVID-19 Projections. *IHME*. <https://covid19.healthdata.org/united-states-of-america> Accessed May 13, 2020.
14. Vespignani A, Chinazzi M, Davis J, et al. Key Projection Results. *COVID-19 Modeling United States*. <https://covid19.gleamproject.org/#infthproj> Accessed May 13, 2020.
15. Centers for Disease Control and Prevention. COVID-19 Forecasts. <https://www.cdc.gov/coronavirus/2019-ncov/covid-data/forecasting-us.html> Accessed May 14, 2020.
16. Tian H, Liu Y, Li Y, et al. An investigation of transmission control measures during the first 50 days of the COVID-19 epidemic in China. *Science* 2020;368:638.
17. Maier BF, Brockmann D. Effective containment explains subexponential growth in recent confirmed COVID-19 cases in China. *Science* 2020: eabb4557.
18. Ohio Department of Health. Public Health Orders. May 11, 2020. <https://coronavirus.ohio.gov/wps/portal/gov/covid-19/resources/public-health-orders/Public-Health-Orders> Accessed May 13, 2020.
19. United States Census Bureau. QuickFacts: Ohio; United States. <https://www.census.gov/quickfacts/fact/table/OH,US/PST045219> Accessed May 13, 2020.
20. Kondik K. *The Bellwether: Why Ohio Picks the President*. Ohio University Press, Athens, OH, 2016.
21. Baorchardt J. Antibody testing places earliest Ohio coronavirus case in early January. *Cincinnati Enquirer*, May 12, 2020. <https://www.cincinnati.com/story/news/2020/05/12/antibody-testing-ohio-coronavirus-case-january/3111627001/> Accessed May 14, 2020.
22. Ohio Department of Health. COVID-19 Dashboard. May 14, 2020. <https://coronavirus.ohio.gov/wps/portal/gov/covid-19/dashboards/overview> Accessed May 14, 2020.
23. Ohio Department of Health. Responsible RestartOhio. <https://coronavirus.ohio.gov/wps/portal/gov/covid-19/responsible-restart-ohio/> Accessed May 14, 2020.
24. Acton A. Director's Order non-essential surgery. *Ohio Department of Health*, March 17, 2020. <https://coronavirus.ohio.gov/wps/portal/gov/covid-19/resources/public-health-orders/directors-order-non-essential-surgery-3-17-2020> Accessed May 14, 2020.
25. Ohio Department of Health. Essential Versus Non-Essential Surgeries COVID-19 Checklist. April 8, 2020. <https://coronavirus.ohio.gov/wps/portal/gov/covid-19/checklists/english-checklists/essential-versus-non-essential-surgeries-covid-19-checklist> Accessed May 14, 2020.
26. State Medical Board of Ohio. Telemedicine Guidance. <https://med.ohio.gov/Telemedicine-Guidance> Accessed May 14, 2020.
27. DeWine M. Executive Order 2020-05D. March 19, 2020. <https://coronavirus.ohio.gov/static/publicorders/Executive-Order-2020-05D-Reader.pdf> Accessed May 4, 2020.
28. DeWine M. Executive Order 2020-09D. April 4, 2020. https://content.govdelivery.com/attachments/OHOD/2020/04/04/file_attachments/1419585/Executive%20Order%202020-09D%20Signed.pdf Accessed May 14, 2020.
29. Administration DE. COVID-19 Information Page. *U.S. Department of Justice Drug Enforcement Administration*. <https://www.deadiversion.usdoj.gov/coronavirus.html#TELE> Accessed May 14, 2020.
30. How to Prescribe Controlled Substances to Patients During the COVID-19 Public Health Emergency. https://med.ohio.gov/Portals/0/Resources/COVID-19/4_3%20DEA%20Decision%20Tree.pdf?ver=2020-04-03-180417-720 Accessed May 14, 2020.
31. Acton A. Order to require an inventory of all ventilators in Ohio. March 31,

2020. <https://coronavirus.ohio.gov/wps/portal/gov/covid-19/resources/public-health-orders/order-to-require-an-inventory-of-all-ventilators-in-ohio> Accessed May 14, 2020.
32. Ohio Department of Health. COVID-19 Release of Protected Health Information to Ohio's First Responders: Protecting Against COVID-19. https://coronavirus.ohio.gov/wps/wcm/connect/gov/674ac428-e0bc-4d3e-b22c-2be2f99f89ce/COVID-19+EMS+Order+04.14.20.pdf?MOD=AJPERES&CONVERT_TO=url&CACHEID=ROOTWORKSPACE.Z18_M1HG1KoNoJ0ooQO9DDDDM3000-674ac428-e0bc-4d3e-b22c-2be2f99f89ce-n88WYWF Accessed May 15, 2020.
 33. WLWT Digital Staff. Ohio's peak for COVID-19 expected May through mid-June, Cleveland Clinic CEO says. April 3, 2020. <https://www.wlwt.com/article/ohios-peak-for-covid-19-expected-may-through-mid-june-cleveland-clinic-ceo-says/32032913#> Accessed May 14, 2020.
 34. University IDlatOS. Forecast Model. April 5, 2020. <https://coronavirus.ohio.gov/wps/portal/gov/covid-19/dashboards/forecast-model/> Accessed May 15, 2020.
 35. Ohio Department of Health. COVID-19 Information on Non-Essential Medical Procedures. April 22, 2020. <https://coronavirus.ohio.gov/wps/portal/gov/covid-19/healthcare-providers-and-local-health-districts-for-healthcare-providers/COVID-19-Information-Non-Essential-Medical-Procedures> Accessed May 15, 2020.
 36. Ohio Department of Health. Governor DeWine Announces Details of Ohio's Responsible RestartOhio Plan. April 27, 2020. <https://coronavirus.ohio.gov/wps/portal/gov/covid-19/resources/news-releases-news-you-can-use/governor-dewine-announces-details-ohios-responsible-restartohio-plan> Accessed May 15, 2020.
 37. Xu S, Li Y. Beware of the second wave of COVID-19. *Lancet* 2020;395: 1321-1322.
 38. Leung K, Wu JT, Liu D, et al. First-wave COVID-19 transmissibility and severity in China outside Hubei after control measures, and second-wave scenario planning: a modelling impact assessment. *Lancet* 2020;395: 1382-1393.
 39. Hellewell J, Abbott S, Gimma A, et al. Feasibility of controlling COVID-19 outbreaks by isolation of cases and contacts. *The Lancet Global Health* 2020;8: e488-e496.
 40. Ohio Department of Rehabilitation & Correction. COVID-19 Inmate Testing / Updated 5/16/2020. <https://coronavirus.ohio.gov/static/DRCCOVID-19Information.pdf>. Accessed 05/17/2020.
 41. J Borchardt, J Balmart. Coronavirus in Ohio: Testing in Prisons. *Cincinnati Enquirer*. April 30, 2020. <https://www.cincinnati.com/story/news/2020/04/30/coronavirus-ohio-dewine-provide-update-covid-19-prisons-2-p-m/3055668001/>. Accessed 05/17/2020

