

# Is Law Working? A Brief Look at the Legal Epidemiology of COVID-19

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**SUMMARY.** Legal intervention has featured prominently in the response to the COVID-19 pandemic. In most places in the world, the legal response has consisted of some combination of traditional disease control measures (individualized testing, contact-tracing, distancing), population-based physical distancing (including school and business closures, stay-at-home orders, gathering bans and masking rules), travel strictures (including travel bans, border closures and quarantines), and economic support measures (which are beyond the scope of this Chapter). Researchers have tried to guide that response in real-time by measuring rapidly changing legal interventions and assessing their current and future effects. In a moment when law can have huge beneficial and deleterious effects, this legal epidemiology can fairly be regarded as a crucial element of the overall COVID-19 response. This Chapter tries to identify important take-aways from this evolving evidence base. The epidemiologic record shows that the U.S. is failing to control the virus, but little else is as clear. Understanding how much better or worse things would be with different legal interventions is complicated given that the effects of rules are dependent on settings (e.g., density), timing (e.g., in relation to population transmission rates), and social context (e.g., social norms and political conditions). It is difficult for researchers to untangle the effects of specific legal requirements, let alone to identify some ideal set of least restrictive elements. Nevertheless, previous experience, prevailing theory, and some direct evidence suggest that some early and aggressive distancing interventions have important benefits. Questions of costs, disparities and side effects remain largely unanswered.

## Introduction

By definition, pandemics spread widely and rapidly. The public health response seeks to reshape behavior and environments to drive down transmission. Law is an apt tool for defining the behavior society requires of people and institutions. Widespread adoption reshapes the social and physical environment towards less vulnerability, which in turn can induce more people and organizations to change their behavior. In short order, a nation where only a few people wore masks and lots of people hung out in bars can become a nation where most people cover their faces and are leery about sitting in crowded restaurant. These legal effects are not automatic. Laws are often ineffective, and laws can be harmful and have inequitable effects. Research to learn what laws work, what laws harm, and how they do it, is essential to guiding policy and practice, even in the short run.

As this Report describes, we are seeing new legal rules for matters as varied and important as methadone treatment and eviction. We have also been forced to see again the often harsh inequities

in seemingly neutral laws: the economic relief in the CARES Act, for example, assumes that people have filed tax returns and that businesses have banks, both of which are less true for Black people and their businesses. These are important to study for effects on health, equity and the path of the epidemic. Most research, however, and this Chapter, has concerned the measures aimed directly at infection. We begin by suggesting some important questions to ask about how law works, which can inform the reading of research findings. We conclude with some practical takeaways for action in the next few months.

## Judging the Effectiveness of Law: Keeping Theory and Logic in Mind

The idea of law as rules is a simple one, but the way law works to change behavior and environments is complicated. In the COVID-19 response, law is being used to instigate major changes in how individuals go about their daily lives as social and economic beings, and to rewrite many of the usual rules and procedures of organizations and systems. The obvious research questions, then,

are whether laws requiring, for example, public mask-wearing, cause people to wear masks in public, and whether they have an inequitable impact (for example, is there disparate enforcement) or unexpected costs (for example, exacerbating shortages in healthcare settings).

In the mad rush of COVID-19, research on the effects of the legal response faces limitations of data, research design and inference. Well-established theory can help in both conducting and consuming research on the COVID-19 legal response, and suggests four particularly useful questions underlying legal impact:

1. Do the targets of the rule actually understand what it requires them to do?
2. Are they able to comply?
3. Are they willing to comply?
4. What will be done to detect and correct non-compliance, or to support compliance?

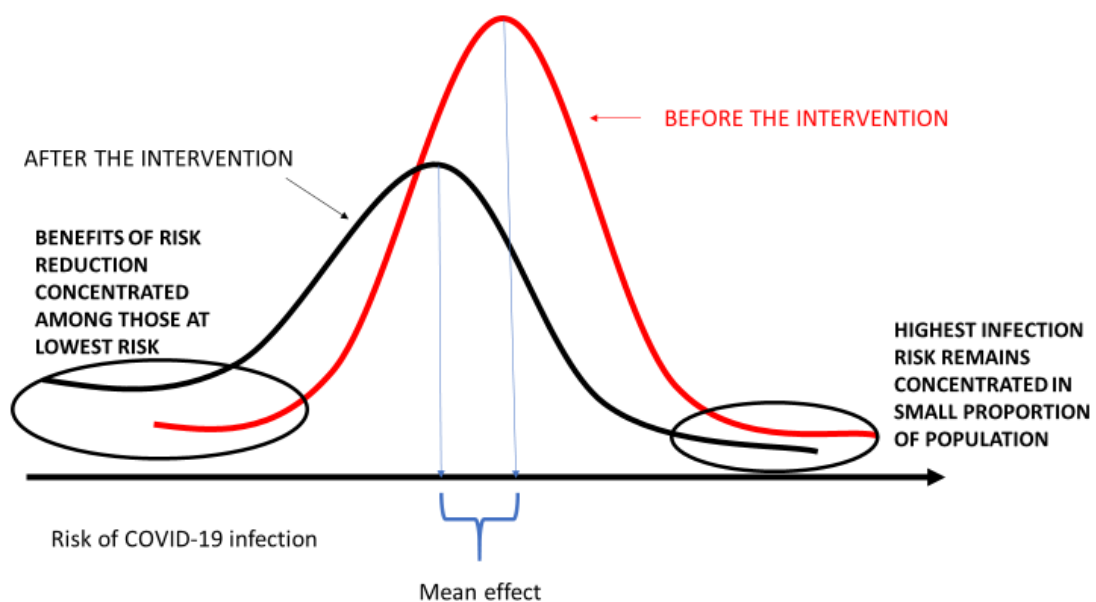
People can't follow rules they don't know about or understand. In emergency response, this problem arises often in complicated regulatory matters like whether a doctor from New York can volunteer at a hospital in Connecticut. Regulatory compliance in emergencies is worthy of serious study, but does not figure prominently in the early COVID-19 research. Many rules, like those closing schools, are unambiguous, and so researchers can assume that most targets of the law know most of what is being required of them. Laws closing schools also are effectively self-enforcing: closing schools, closes schools. On the other hand, closing schools does not guarantee that children will not congregate. To produce desired effects, most laws – and especially those targeting individual behavior – rely on high levels of voluntary compliance. Compliance is the important and hard part of COVID-19 policy and

research. Several elements are important to voluntary compliance:

- People are more likely to obey a law if they think the law is proper and that they have been treated fairly by the system; people who distrust government and believe the pandemic is a hoax will be less likely to voluntarily comply with social-distancing rules than those who trust the government and believe action is needed (Tyler, 1990).
- Whether or not people obey the law depends in part on the perceived attitudes of their peers and what they feel compliance says about their social identity; if wearing a mask becomes identified with one political faction, then those in other factions will regard mask-wearing as a betrayal of their own group (Kahan, 2013).
- Legal requirements might also provide social-behavioral cover, allowing businesses, for example, to require masks without having to defend the requirement on philosophical or health grounds (“sorry, I have to ask you put that mask on”) (Flay & Schure, 2013).
- Compliance has to be feasible; economic necessity may drive a worker without paid sick leave to break isolation and work when sick.

Detection of non-compliance and correction or punishment (deterrence) is most people's default theory of how law has an effect: people obey so as not to get in trouble. While voluntary compliance is the much more important driver, the visible presence of enforcement authority (like police at the borders of a locked-down community) has been a feature of the COVID-19 response and may be important to compliance locally. Perhaps more important, in a negative way, are signals from government that suggest the rules are not actually going to be enforced, which may be read as an invitation not to comply.

Figure 2.1: Potential Disparities in Risks and Benefits of COVID-19 Control Measures. Source: Authors drawing on Frohlich, K. L., & Potvin, L. (2008). Transcending the known in public health practice: the inequality paradox: the population approach and vulnerable populations. *Am J Public Health*, 98(2), 216-221.



Finally, it is useful to keep in mind how population-level interventions can reduce overall risk but leave disparities untouched or even worse. Figure 2.1 illustrates an intervention that reduces overall infection rates but substantially increase disparities: those at highest risk – say, low-wage essential workers unable to maintain physical distance from others – were already at high risk; a stay-at-home order does not change their risk, and but may benefit better off, low-risk people who can comfortably stay at home, deepening overall social inequity in disease.

### The First Layer of Evidence: Temporal Association of Law and Pandemic Trends

We now have more than six month’s global experience with COVID-19 control. The legal responses have been tracked by many researchers and organizations in great detail (links to the main tracking sites can be found on the “COVID-19 Legal Research Resources” page at LawAtlas.org.) Properly done, this research is not only informative but also provides the legal data necessary for research to assess legal implementation and effects.

Legal mapping of changes in law over time has been linked with epidemiologic data to depict the association in time of control measures and pandemic features like new cases, prevalence rates, testing and mortality. In the United States, the high-level story is straightforward: the adoption of state physical distancing measures has been temporally associated with flattening of infection rates, especially when measures were deployed earlier and longer. This observation is consistent with events in other countries, and makes sense in theory: the mechanism of effect – fewer people congregating together leads to fewer infections – is obviously plausible. Also, voluntary compliance appears to have been very high in most places, which in turn fits with the high levels of support for physical distancing measures reported in polls (Lazer et al., 2020). We can sensibly assume that strict physical distancing has “worked.”

Unfortunately, this kind of high-level analysis tells us a lot less than one might think. The state-by-state association of pandemic trends with physical distancing measures is actually quite varied, as are the specific measures that people lump into the broad “physical distancing” category. Given the huge social and individual costs of the most stringent approaches, knowing that largely shutting down normal social and economic life “works” in changing pandemic trends does not address urgent questions about the relative impact of discrete social distancing elements (school and business closures, stay at home, gathering bans) let alone whether less restrictive combinations or variants might be also be associated with the same or even better results. In fact, these correlational analyses do not even tell us whether law was necessary at all, because we cannot assume that clear behavioral recommendations combined with some level of social responsibility and fear of the virus might not have produced sufficient behavior change to flatten the curve without legally established rules. This seems to have happened in Japan.

Differences in baseline infrastructure and pandemic conditions also confound observed associations. The traditional strategy for infectious disease control is a three-legged stool: (1) identify

infection with testing, (2) assess exposure with contact tracing, and (3) prevent known or reasonably infectious individuals from congregating. In the United States, the stool broke immediately because of a fiasco with test development. It is unclear whether the contact tracing leg could have withstood demand given long-term declines in public health funding. In other nations where testing and contact tracing infrastructure was robust, the virus has been contained with fewer population-based distancing rules, and similarly sturdy three-legged stools have been observed in places successfully emerging from lockdowns. Broad-based stay-at-home and closure laws sometimes emerge as aggressive prevention and other times as frantic last resorts in the face of severe control measures.

“Big picture” conclusions from overlaying law onto disease trends can be helpful – and are practically inevitable. Although data are imperfect, striking racial disparities in infection are now incontrovertible, as shown in Figure 2.2, and point to the importance of longstanding social, and not merely biological, mechanisms of vulnerability. Sharpening responses so that we are using scalpels and not butter knives requires research that deploys designs and analytic methods to produce evidence of the causal impact of specific measures or combinations of measures. We turn to that evidence next.

### The Second Layer of Evidence: Observational and Simulation Research

A huge demand for answers to very difficult questions on a very short timeline is a considerable challenge to social science. The work so far takes two principal forms: studies looking at events in just one or a few places over a short time frame (observational studies) and studies that mix observed data with educated guessing and assumed processes to ask “what if?” questions (simulation studies). Randomized-controlled trials, the “gold standard” in clinical research, are rare in legal epidemiology, because the scientists cannot choose (randomly assign) who is exposed to a law and who is not.

Observational studies can use a variety of design elements and analytic strategies to credibly isolate causes and effects. The practical gold standard in legal epidemiology is the “natural experiment” where researchers take advantage of similar legal measures being implemented at different times in different places. Natural experiments can support confident inferences of causation because they allow scientists to compare “treated” and “untreated” populations on multiple dimensions, and to use a variety of sophisticated analytic strategies to test whether outcomes are consistent with hypothesized causal processes.

Both observational and simulation studies use modeling techniques that have aptly been called “wrong but useful” (Holmdahl & Buckee, 2020). As the authors explain, “[f]orecasting models are often statistical in nature, fitting a line or curve to data and extrapolating from there – like seeing a pattern in a sequence of numbers and guessing the next number, without incorporating the process that produces the pattern.” Mechanistic models, the other broad type in play during COVID-19, “forecast or simulate future transmission scenarios under various assumptions about

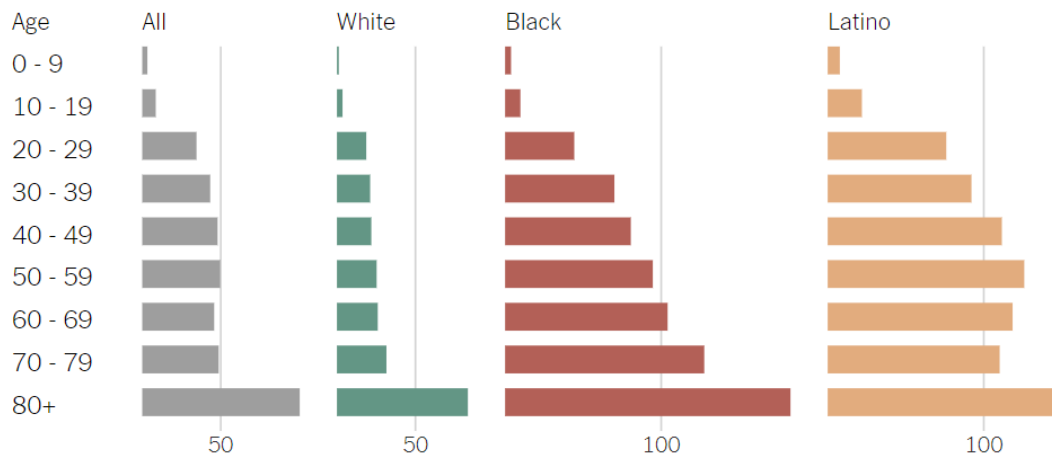


Figure 2.2: Coronavirus Cases Per 10,000 People, by Age and Race. Source: New York Times analysis of CDC data, <https://www.nytimes.com/interactive/2020/07/05/us/coronavirus-latinos-african-americans-cdc-data.html>

parameters governing transmission, disease, and immunity.” These models build in feedback loops and allow researchers to test the effects of alternative assumptions about what measures are used and how effective various response components will be. Simulations are both more useful than purely statistical models in providing guidance about the future effects of policy decisions, and more likely to be wrong. With those limits in mind, we proceed to further insights from research.

### Timing Matters: Early Action When Prevalence Is Low Can Prevent Severe Outbreaks

Research seems to confirm intuition that earlier adoption of control measures delays or even prevents larger spikes in transmission (Nussbaumer-Streit et al., 2020). According to one modeling study, China would have reduced cases by 66%, 86% and 95% had it instituted travel restrictions, contact tracing, quarantine and testing of some travelers 1, 2 or 3 weeks earlier (Lai et al., 2020). A similar modeling study of transmission in U.S. counties estimated substantial decreases in pre-May death rates by pushing up control measures by just one (61.6%) or two weeks (55%) (Pei et al., 2020). Neither study has yet completed peer review. These models are consistent with what has been observed in several other early-reacting countries like Vietnam, which totally suppressed the virus so far through aggressive control measures including travel restrictions, quarantine and school closures in January (Ha et al., 2020).

### Traditional Control Measures Can Work If Properly Executed

As we write, the impact of large-scale systematic or mandatory testing, tracing, quarantine of the exposed, and isolation of the infected has not been intensively studied for COVID-19. While we have “case studies” of countries that have successfully used one or more variants of these methods, including news stories about places like Korea and Germany, and published research (Ha et al., 2020; Ng et al., 2020) including a Cochrane review of both COVID and non-COVID quarantine studies (Nussbaumer-Streit et al., 2020), the quality of evidence is low. The same applies to traditional travel

restrictions and sanitary cordons. The initial cordon sanitaire of Wuhan was found to have reduced new cases in other countries by almost 80% until mid-February (Chinazzi et al., 2020), but we have no evidence that the sort of quarantine orders imposed on travelers from abroad by the federal government or domestic travelers by some states were successfully implemented (Myers et al., 2020) or have had any impact.

A recent modeling study in the UK suggests that effectiveness of case-finding and control would depend on the back-end intensity of the response – how completely the contacts identified were quarantined and isolated even from their families. Perhaps more importantly, the study gave an estimate of the scale of action required for control – up to 41 people would have to be quarantined for every new case of infection. Overall, the simulation literature suggests that the package of traditional measures still recommended by WHO can control a COVID-19 outbreak, but the “probability of control decreases with long delays from symptom onset to isolation, fewer cases ascertained by contact tracing, and increasing transmission before symptoms” (Hellewell et al., 2020). Evidence showing that countries can build and maintain the necessary capacity remains limited.

### Population-Based Physical Distancing Combining School and Business Closures, Stay-At-Home Orders and Gathering Bans Can Suppress Transmission While They Are In Effect.

Current evidence suggests that broad limitations on populations, without individualized assessment of infection or exposure, slow and sometimes suppress the spread of the virus. However, disentangling the effects of specific requirements is difficult, and some benefits are small and may be short-lived. Based on research from previous epidemics and a few non-peer-reviewed modelling studies for COVID-19, a literature review concluded that school closures probably reduce transmission and death by small amounts. As the authors note, however, limited research does not account for secondary effects of closures on parents (Viner et al., 2020).

Laws requiring people to stay-at-home and closing businesses appear to have had substantially larger benefits. One study in the United Kingdom found that daily contacts with other people shrank from 10.7 to 2.8 after the adoption of a stay-at-home law, which the researchers relied upon in accurately forecasting significant decrease in transmissions in the following month (Jarvis et al., 2020). Another team estimated that without these laws transmission rates in the United States would have been 10 to 35 times greater (Courtemanche et al., 2020). The current resurgence of cases after the removal of these requirements is consistent with the evidence, but differences among states and regions point to the important effect of voluntary behavior change in the population.

### Large-Scale Public Mask Wearing

There is not yet a high-quality body of evidence showing that mask-wearing significantly reduces transmission of respiratory diseases like flu and COVID-19 (Lyu & Wehby, 2020). It is also clear that in many places, some people wear masks without being required to do so and others resist mask-wearing even under considerable coercion. However, a new study exploring the relationship between cases and variation in state mask-wearing mandates found that mandates substantially reduced transmission accounting for as many as 450,000 fewer cases possibly in April and May (Lyu & Wehby, 2020). The research on mask-wearing mandates reflects the turbulent and unsettled science of the moment, as public health officials and experts are learning by doing.

### Legal Measures to Control COVID-19 Have Not Prevented and May Have Contributed to Significant Racial Disparities in US Infections

Explaining documented disparities in COVID-19 infection and death is an important public health priority, though observed and hypothesized mechanisms are hardly surprising. Analysis of phone data in New York illustrates how poor neighborhoods with more people of color are less likely to shelter in place during the day, probably because they must work (Coven & Gupta, 2020). Emerging research also reinforces the disparate effects of the criminal justice system (Reinhart & Chen, 2020).

### Conclusions

Drawing inferences about how best to control COVID-19 from layering epidemiological data and legal interventions is like studying flight by kite-flying. We can learn some basic lessons, but we will not be getting to the moon anytime soon. Adding in early observational and simulation studies gets us to the level of aeronautical engineering, which is better – but not the rocket science we need to guide response in a hugely complicated global social and economic ecosystem. Because decisions must be made, we do the best we can, but given the limits of confidence in our observations and our conclusions, “truth” has to be treated with skepticism. Findings or assumptions that don’t fit with theory should be considered suspect until better evidence emerges. Our “recommendations” are subject to all the limitations described in this Chapter, and should be regarded as educated guesses based on reasoning and best available evidence. 🌞

# Recommendations for Action

## Federal government:

- The federal government should support essential policy experimentation by minimizing preemption or other interference with reasonable local control measures.
- The federal government should make infection and mortality data widely available to researchers, which includes expanding the infrastructure for testing as well as the mechanisms for compiling and disseminating resulting data.
- Congress and the White House should jointly convene an independent commission or National Academies committee to examine the causes of racial and ethnic disparities in COVID-19 infections and associated harms.

## State governments:

- State governments should support essential policy experimentation by minimizing preemption or other interference with reasonable local control measures.
- States should continue to promote physical distancing.
- States should strengthen capacity to implement basic public health control methods (“test and trace”).
- States should avoid travel-related restrictions, which are not supported by evidence but almost surely have large costs and harms.
- States should require mask wearing and social distancing where strict physical distancing restrictions are relaxed. Mask wearing in settings where physical distance cannot be maintained, and voluntary reduction of social contacts, would be sensible for everyone to maintain for the foreseeable future.
- States should actively address racial disparities. Racial disparities in COVID-19’s toll are striking, and so probably are disparities related to socio-economic status. If this is to change, population measures to increase physical distance have to be complemented by risk reduction measures to support people who are required by their jobs or economic necessity to work, travel on public transportation, and spend time in congregate settings. These may include provision of high-quality PPE appropriate to the physical situation, hazard pay, paid sick leave, health insurance, and redesign of work procedures and settings.

## Researchers:

- Researchers should anticipate and start working to understand vaccine hesitancy.
- Researchers should develop and enforce a typology of legal interventions to ensure that research can be accurately and efficiently synthesized.
- Researchers should adopt a code of pandemic publication ethics, which aims to preserve and enhance the credibility of researchers as source of rigorous science created in good faith.
- Researchers conducting simulation studies should provide a date for their simulated outcome, and they or other researchers should systematically review performance compared with reality.



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