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## Catch and Contain Novel Pathogens Early!—Assessing U.S. Medical Isolation Laws as Applied to a Future Pandemic Detection and Prevention Model

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## CATCH AND CONTAIN NOVEL PATHOGENS EARLY!—ASSESSING U.S. MEDICAL ISOLATION LAWS AS APPLIED TO A FUTURE PANDEMIC DETECTION AND PREVENTION MODEL

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By April Xiaoyi Xu\*

### I. INTRODUCTION: PROPOSING A MODERN “TEST-AND-ISOLATE” FUTURE PANDEMIC PREVENTION MODEL AND IDENTIFYING RELEVANT LEGAL ISSUES

As of July 2, 2021, there have been 196,553,009 confirmed cases of the Coronavirus Disease (COVID-19), including 4,200,412 deaths, globally.<sup>1</sup> Unfortunately, infectious diseases have been an “unavoidable fact of life” throughout history.<sup>2</sup> While the global community looks forward to a gradual return to normalcy from COVID-19 with an increasing number of individuals getting vaccinated on a daily basis,<sup>3</sup> the COVID-19 public health crisis has exposed significant inadequacies in many countries’ pandemic responses—the United States included.<sup>4</sup> Governing authorities must actively consider more effective solutions to quickly detect and prevent the spread of future pandemics.

One proposed model that offers promising potential, but is not yet developed in greater detail, is a future pandemic detection and monitoring architecture. This Comment will refer to this architecture as the “test-and-isolate model.” In his May 2020

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\* Juris Doctor, Harvard Law School, Class of 2021. I would like to thank Professor I. Glenn Cohen for his guidance on this Comment and his mentorship throughout my law school years. I also wish to take this opportunity to thank my family, friends, boyfriend, and professors for their constant support. I am grateful to my mentors at the World Health Organization (WHO) for sparking my initial interest in public health when I interned there as an undergraduate student, and to Andrew B. Liu (Ph.D. candidate at Harvard Medical School) for sharing his insights on epidemiology and bioinformatics. I would also like to thank the editors of the *Michigan Journal of Law Reform* for selecting this Comment for publication and for working tirelessly with me to finalize this article.

1. *WHO Coronavirus (COVID-19) Dashboard*, WORLD HEALTH ORG., <https://covid19.who.int> (last visited July 30, 2021) [<https://perma.cc/DY8J-H89Z>].

2. See MADELINE DREXLER, *WHAT YOU NEED TO KNOW ABOUT INFECTIOUS DISEASE* (2010), <https://www.ncbi.nlm.nih.gov/books/NBK209704/> [<https://perma.cc/XV44-5HJV>].

3. See, e.g., *Statistics and Research: Coronavirus (COVID-19) Vaccinations*, OUR WORLD IN DATA, <https://ourworldindata.org/covid-vaccinations> (last visited Apr. 26, 2021) [<https://perma.cc/KQP5-CS7G>].

4. See, e.g., Richard Wike, Janell Fetterolf, & Mara Mordecai, *U.S. Image Plummets Internationally as Most Say Country Has Handled Coronavirus Badly*, PEW RSCH. CTR. (Sep. 15, 2020), <https://www.pewresearch.org/global/2020/09/15/us-image-plummets-internationally-as-most-say-country-has-handled-coronavirus-badly/> [<https://perma.cc/V7T3-XEBK>].

*Scientific American* article, biochemist Dr. David J. Ecker recommends strategically placing modern high-speed metagenomic sequencing technology in urban hospitals across the United States to flag previously-unknown pathogens before the infectious agents have the opportunity to spread widely and pose threats of a new pandemic.<sup>5</sup> Under this model, during a time period without any apparent pandemics (peacetime), the 200 biggest metropolitan hospitals<sup>6</sup> in the U.S. would automatically run diagnostic tests up-front for novel causative agents for patients who visit the emergency room with severe respiratory symptoms that are possibly infectious.<sup>7</sup> If such a system detects a sufficiently serious pathogen, public health agencies would send out diagnostic tests to all residents in the affected geographical area(s) within weeks and isolate those who test positive.<sup>8</sup> This system could be integrated with contact tracing and more standard outbreak response.

This model can be significantly more effective than the system that the U.S. currently has in place, which has not consistently tested and isolated asymptomatic carriers of novel pathogens sufficiently early in the disease spread timeline. Given the exponential nature of pandemics,<sup>9</sup> pandemic response will be more feasible and cost-effective the earlier it begins—every day counts in the early stages. Ecker analogizes this system to common forest fire prevention strategies that “survey aggressively for smaller brush fires and

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5. David J. Ecker, *How to Snuff Out the Next Pandemic*, *Sci. AM.* (May 18, 2020), <https://blogs.scientificamerican.com/observations/how-to-snuff-out-the-next-pandemic/> [<https://perma.cc/DWP5-Q5ZF>]. Ecker highlights the importance of detecting previously-unknown pathogens, because “modern molecular diagnostic technologies detect only those infectious agents we already know exist” and “come up blank when presented with a novel agent”. This means that with the current U.S. public health infrastructure, new or unexpected pathogens cannot be detected until “there are too many unexplained infections to ignore,” with the potential for the pathogens to spread widely and become a pandemic.

6. *Id.* Note that while Ecker calls these strategically-selected large urban hospitals “surveillance hospitals” in his article, this Comment generally chooses to avoid using the word “surveillance” with this model due to the negative connotation of the word. Instead, this Comment coins the term “test-and-isolate” and considers the proposed model a pandemic detection, monitoring, and prevention model. “Given national epidemiological data—on infection rates; where symptomatic people seek health care; and how often diagnostic tests are ordered—a remarkably small number of surveillance sites would be required in order to identify an outbreak of an emerging agent.” *Id.*

7. *See id.*

8. *See id.* It is important to note that this Comment focuses on the “isolate” part of the “test-and-isolate” model; while the legal issues surrounding genotype testing are important, they fall outside the scope of this Comment.

9. *See, e.g.,* Junling Ma, *Estimating Epidemic Exponential Growth Rate and Basic Reproduction Number*, 5 *INFECTIOUS DISEASE MODELLING* 129–41 (2020).

stomp them out immediately.”<sup>10</sup> The proposed “test-and-isolate” future pandemic prevention model responds earlier than existing status quo systems in two major ways. Firstly, the proactive diagnostic testing in hospitals detects the new pathogen earlier. Secondly, identifying and isolating infected persons within weeks reduces disease spread among other members of society more quickly. Because isolating only those who test positive is less disruptive than more general social distancing measures, the test-and-isolate model would have made it economically and politically less costly to isolate early during the Covid-19 pandemic.<sup>11</sup> According to Monte Carlo simulations—a form of computational algorithm that applies “repeated random sampling to obtain the likelihood of a range of results of occurring,”<sup>12</sup> there is a “95 percent probability of identifying an emerging infectious disease outbreak if only seven symptomatic patients seek health care in this system.”<sup>13</sup>

The legal architecture surrounding medical isolation plays an essential role in determining whether test-and-isolate methodology could be successfully implemented in the U.S. in practice. Given that Ecker’s proposed model is relatively new and little explored, especially in the field of law,<sup>14</sup> this Comment focuses on the legal issues surrounding the “isolate” portion of the aforementioned “test-and-isolate” model as part of the broader pandemic detection and prevention architecture. Despite the potential of Ecker’s model in preventing the next public health tragedy, there are a number of legal challenges that may obstruct the practical implementation of such a model, as the law strives to balance pressing public health needs with individual civil liberty rights. For a model that prioritizes early detection and early response over exactitude on factors such as the novel disease’s incubation period and severity level, the status quo law in the U.S. is disappointingly insistent on demanding more certainty and rigorous scientific evidence of future public health risks before authorities can legally mandate medical

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10. *Id.*

11. *See id.* (“The cost to set up and run a surveillance architecture in 200 urban hospitals in the [U.S.] would be well under \$1 billion, and it could be done within a year. This cost is beyond trivial compared to the current cost of the COVID-19 catastrophe. The CARES Act alone has cost our country over \$2 trillion.”).

12. IBM Cloud Education, *Monte Carlo Simulation*, IBM (Aug. 24, 2020), <https://www.ibm.com/cloud/learn/monte-carlo-simulation> [<https://perma.cc/8ZL5-7KME>].

13. Ecker, *supra* note 5.

14. Although many have written about medical isolation and quarantine laws in the context of pandemics such as Ebola and COVID-19, it appears that this future-oriented pandemic prevention model has not yet been explored through a legal lens.

isolations, although there are ambiguities and uncertainties in relevant federal and state law alike.

Having provided an overview of the “test-and-isolate” model, this Comment next zooms in on current pandemic-related medical isolation laws in the U.S., offering an overview of the relevant federal and state laws, a brief survey of recent scholarship in relation to COVID-19, and a summary of an influential recent precedent, *Hickox v. Christie*.<sup>15</sup> This Comment then focuses on applying current laws to the “isolate” part of the proposed pandemic prevention model to determine gaps and challenges for the proposed model given the U.S. legal landscape. Finally, this Comment will conclude with forward-looking recommendations and reform proposals.

## II. U.S. MEDICAL ISOLATION LAWS IN THE PANDEMIC CONTEXT: A CROWDED INTERSECTION

Despite the U.S. Government’s long history of quarantine and isolation orders in the medical context, “the legal instruments for imposing quarantine are not especially well-developed.”<sup>16</sup> In the U.S., the authority to isolate and quarantine individuals in the communicable disease context “stands at a crowded intersection of federal, state, and constitutional law.”<sup>17</sup>

At the federal level, the Commerce Clause gives Congress the authority to impose quarantines and isolations.<sup>18</sup> Pursuant to the Commerce Clause, Congress enacted the Public Health Service Act (PHSA), Section 264 of which grants the Secretary of Health and Human Services the authority to make and enforce regulations necessary “to prevent the introduction, transmission, or spread of communicable diseases from foreign countries into the States or possessions, or from one State or possession into any other State or possession.”<sup>19</sup> Subsection 264(b) of the statute grants authority to quarantine or isolate an individual to control the transmission and

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15. *Hickox v. Christie*, 205 F. Supp. 3d 579 (D.N.J. 2016).

16. Roni Adil Elias, *Preventing Contagion and Protecting Civil Liberties: Problems in Quarantine & Isolation Law in the United States & Suggestions for Reform*, 7 CHARLOTTE L. REV. 135, 136 (2016).

17. Devin Schindler, Gregory Ripple, Melissa Markey, Jesse DePauw, Laura M. Napiewocki & Sangeeta Ghosh, *Pandemic Legal Preparedness: A Brief Overview*, 96 MICH. BAR J. 28, 28 (2017).

18. U.S. CONST. art. I, § 8, cl. 3.

19. 42 U.S.C. §§ 201, 264(a).

spread of communicable diseases.<sup>20</sup> In 2000, the Secretary transferred such powers to the Director of the Centers for Disease Control and Prevention (CDC).<sup>21</sup>

Importantly, applied to the “test-and-isolate” model, the statute defines the term “qualifying stage” for an individual to go through mandatory isolation or quarantine as (1) “in a communicable stage” or (2) “in a pre[-]communicable stage, if the disease would be likely to cause a public health emergency if transmitted to other individuals.”<sup>22</sup> This means that the individuals who would need to be mandated to go through involuntary isolation under the “test-and-isolate” model would be considered being in the “qualifying,” “pre[-]communicable” stage.

At the state level, the legal authority of individual states to investigate and control pandemic outbreaks is grounded in the police powers reserved to them under the Tenth Amendment.<sup>23</sup> As federal authority regarding isolations and quarantines is limited by the scope of executive orders, the CDC defers to state authority in “their primary use of their own separate quarantine powers” and “only in rare situations” (such as “time-sensitive settings”) anticipates the need to use federal authority.<sup>24</sup> While states’ authority to order quarantines and isolations vary widely, there is a commonality most states share: state quarantine/isolation laws tend to be “very old,” with many relevant statutes ranging from forty to one hundred years old.<sup>25</sup> Unsurprisingly, the older statutes “often do not reflect contemporary scientific understandings of disease, [or] current treatments of choice,” and were often drafted to address specific epidemics from the past.<sup>26</sup> A number of states require a state

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20. 42 U.S.C. § 264(b).

21. 42 C.F.R. § 70.2-70.8 (2015); *Hickox v. Christie*, 205 F.Supp.3d 579, 590 (D.N.J. 2016).

22. 42 U.S.C. § 264(d)(2).

23. Schindler et al., *supra* note 17, at 28.

24. CDC, QUESTIONS AND ANSWERS ON THE EXECUTIVE ORDER ADDING POTENTIALLY PANDEMIC INFLUENZA VIRUSES TO THE LIST OF QUARANTINABLE DISEASES, <http://www.survivalring.org/pandemic/index.php?file=Questions%20and%20Answers%20on%20the%20Executive%20Order%20.pdf> (last visited Apr. 1, 2021).

25. Roni Adil Elias, *Preventing Contagion and Protecting Civil Liberties: Problems in Quarantine & Isolation Law in the United States & Suggestions for Reform*, 7 CHARLOTTE L. REV. 135, 144 (2016).

26. See, e.g., *State Quarantine and Isolation Statutes*, NAT’L CONF. OF STATE LEGISLATURES (Aug. 7, 2020), <https://www.ncsl.org/research/health/state-quarantine-and-isolation-statutes.aspx> [<https://perma.cc/X6VX-DW6Y>]; Lawrence O. Gostin, Scott Burris & Zita Lazzarini, *The Law and the Public’s Health: A Study of Infectious Disease Law in the United States*, 99 COLUM. L. REV. 59, 101-02 (1999).

of public health emergency to exist for the state to issue mandatory quarantine and/or isolation orders.<sup>27</sup>

According to Professor Lindsay Wiley, a health law expert who has written about recent developments in quarantine and isolation orders in the COVID-19 context, the U.S. system is set up in a way in which “the states hold the reins on what we call community mitigation measures: social distancing, mask wearing,” while the federal government remains “the sole actor in this country with the resources and the inter-state coordinating authority to provide for other responses,” especially “well-coordinated supported isolation which could have contained the pandemic” and surveillance level testing to inform state-level responses.<sup>28</sup> The federal government’s authority in the quarantine/isolation context is “permissive, rather than mandatory.”<sup>29</sup>

During the most recent COVID-19 pandemic, legal scholars emphasized a few general principles in relation to medical isolations. A core principle for governments is employing “the least restrictive means necessary to protect public health.”<sup>30</sup> According to health law expert Lawrence O. Gostin and his co-authors, to meet this standard, authorities must base quarantine and isolation on “rigorous scientific assessment of risk and effectiveness,” and employ such measures only if the individual “is known or highly suspected to have been exposed to the disease, and only for the maximum duration of incubation (fourteen days for COVID-19).”<sup>31</sup> Gostin and his co-authors consider mandatory isolations and quarantines to carry “enormous legal, ethical, and logistical challenges” and, accordingly, should be used “only as a last resort.”<sup>32</sup> In the same article, the authors recommend encouraging self-isolation and self-quarantine, considering these measures as

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27. See, e.g., ME. REV. STAT. tit. 22, § 802(2) (West 2021); CONN. GEN. STAT. § 368e-19a-221 (2003); ARIZ. REV. STAT. § 36.799-89.

28. Professor Lindsay Wiley Shares Insights on Health Policy Amid the Pandemic During “WCL Faculty Speaks: COVID-19 and Public Health Law,” AM. UNIV. (June 11, 2020), <https://www.wcl.american.edu/news-events/news/professor-lindsay-wiley-shares-insights-on-health-policy-amid-the-pandemic-during-wcl-faculty-speaks-covid-19-and-public-health-law/> [<https://perma.cc/7MTW-CPJL>].

29. *Id.*

30. Lawrence O. Gostin, Eric A. Friedman & Sarah A. Wetter, *Responding to COVID-19: How to Navigate a Public Health Emergency Legally and Ethically*, HASTINGS CENT. REP. (Mar. 26, 2020), <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7228225/> [<https://perma.cc/8HE8-CS4F>].

31. *Id.*

32. *Id.*

“generally effective” when individuals are “properly informed.”<sup>33</sup> Meanwhile, the authors do recognize the relative ease of enforcing isolation and quarantine orders against individuals posing a known danger.<sup>34</sup> Their main concern is large-scale quarantines “imposed without any individualized risk assessment.”<sup>35</sup>

Caselaw that is directly applicable to the “test-and-isolate” model is wanting given the novel nature of the proposed pandemic prevention architecture and the understandable lack of focus on future pandemics in lawsuits. Among existing precedent, there are more cases on medical quarantines than medical isolations in the pandemic context, although court opinions and law review publications often fail to clearly distinguish between quarantine and isolation precisely. As used in contemporary health practices, “quarantine” refers to the “separation of individuals or groups who are not ill but are thought to be at risk of becoming infectious,” while “isolation”—the focus of this Comment—is defined as “the separation of someone who is already ill.”<sup>36</sup> Unlike isolation, quarantine does not depend on an actual diagnosis, but rather on “the belief that the individual has been exposed to a communicable disease and may at some future time become infectious.”<sup>37</sup> Importantly, the “test-and-isolate” approach advocated for in this Comment, recommends *isolating* individuals who test positive for the newly-detected pathogen early.<sup>38</sup> Ecker does not explicitly address quarantine as the next precautionary measure for the broader community.

A recent influential case involving medical isolation in a global pandemic context is *Hickox v. Christie*.<sup>39</sup> In *Hickox*, the plaintiff, Kaci Hickox, was a trained nurse who served as a medical team leader for treating Ebola in Sierra Leone for Medecins Sans Frontieres (MSF).<sup>40</sup>

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33. *Id.*

34. *Id.*

35. *Id.*

36. Wendy E. Parmet, *Quarantining the Law of Quarantine: Why Quarantine Law Does Not Reflect Contemporary Constitutional Law*, 9 WAKE FOREST J.L. & POL’Y 1, 7 (2018).

37. *Id.* at 7–8.

38. See Ecker, *supra* note 5. Logically, in Ecker’s model, the next step could be quarantining those who have been in close contact with the isolated individuals. These quarantine measures, however, likely implicate more civil liberty concerns given that they involve more members of the community who are more likely safe from the new pathogen than the individuals ordered to go through isolation under the “test-and-isolate” model because they are already displaying relevant symptoms and/or have tested positive for the newly-detected pathogen.

39. *Hickox v. Christie*, 205 F. Supp. 3d 579 (D.N.J. 2016).

40. See *id.* at 584–85.

Just as she was leaving Sierra Leone to return to the U.S., Governor Christie signed Executive Order 164 (which created a New Jersey-wide “Ebola Preparedness Plan” (EPP)) mandating active health screening for passengers arriving from West African countries due to public health concerns regarding Ebola.<sup>41</sup> Hickox’s temperature check indicated that she had a fever, and she was ordered to undergo medical isolation.<sup>42</sup> The “Administrative Order Declaring Quarantine and Isolation of Kaci Hickox” invoked the powers of the Department of Health (DOH) under N. J. Stat. Ann. § 26:4 et seq. and N.J.A.C. § 8:57 et seq.: “Ebola is a contagious, often fatal disease, with an incubation period of up to 21 days . . . Hickox had had contact with infected individuals . . . was at high risk of exposure . . . [and] she experienced the onset of a fever”; because her “medical status was uncertain,” the DOH “could not rule out that she was infected and posed a danger to public health.”<sup>43</sup> The Order required Hickox to be in isolation “until it [was] determined that she [did] not present a danger to the public health.”<sup>44</sup> Hickox subsequently sued the government for violating her civil liberty rights. The New Jersey district court, considering existing precedent on quarantine case law,<sup>45</sup> ruled that it *could not* find that Hickox’s mandatory “isolation violated any clearly established constitutional principle embodied in quarantine case law.”<sup>46</sup> Citing landmark isolation/quarantine cases including *Jacobson*, *Reynolds*, and *Shinnick*, the court held that “given the important public interests at stake, the cases give the authorities a great deal of leeway to detain persons who may turn out not to have been sick at all.”<sup>47</sup> Applied to this case, although Hickox tested negative for Ebola, the court saw that the state was reasonable in wishing to determine whether Hickox’s “symptoms would worsen” and remaining concerned that she had “previously registered a fever.”<sup>48</sup>

*Hickox* is relevant to the scope of this Comment not only as it centers medical isolation in a global pandemic context, but also because a key element of the fact pattern is that the severity of the

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41. *Id.* at 585.

42. *See id.* at 586–87.

43. *Id.* at 586–87. Fever is a symptom of the Ebola disease. *See, e.g., Ebola (Ebola Virus Disease): Signs and Symptoms*, CTRS. FOR DISEASE CONTROL & PREVENTION, <https://www.cdc.gov/vhf/ebola/symptoms/index.html> [<https://perma.cc/TK3F-DTVY>] (last visited June 7, 2021).

44. *Hickox v. Christie*, 205 F. Supp. 3d 579, 587 (D.N.J. 2016).

45. *See id.* at 590–94.

46. *Id.* at 593.

47. *Id.*

48. *Id.* at 594.

plaintiff nurse's illness at the time was unknown—similar to the scenario in the future pandemic prevention architecture, where the severity of the previously-unknown pathogen is unpredictable.

The next section of this Comment concentrates on applying the aforementioned legal principles and the court's reasoning in *Hickox* to the specific "isolate" portion of the proposed pandemic detection system.

### III. APPLYING CURRENT MEDICAL ISOLATION LAWS TO THE "ISOLATE" PORTION OF THE PANDEMIC PREVENTION MODEL: CRITIQUES AND CHALLENGES

As the findings in Section II demonstrate, the laws governing isolation in the pandemic context in the United States involve a crowded intersection of federal, state, and constitutional laws.<sup>49</sup> Unfortunately, legal issues with regards to infectious diseases are "generally not well developed."<sup>50</sup> These features of relevant U.S. laws present layers of challenges when applied to the "isolate" portion of Ecker's proposed future pandemic detection architecture. This section of the Comment will address several relevant concerns, critiquing the current structure in place while anticipating legal challenges that will likely arise if we were to implement the "test-and-isolate" system in the U.S.<sup>51</sup> Subsection (A) will focus on temporal concerns, including the various medical uncertainties in connection with the legal features of the current system. Subsection (B) examines the interplay between federal and state authority over mandatory isolation orders and their implications on Ecker's proposed system. Last but not least, Subsection (C) considers the broader picture, applying Gostin's key critiques of the U.S. public health law system to this specific research focus.

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49. See *supra* Part II.

50. Schindler et al., *supra* note 17, at 28.

51. As a preliminary matter, it is worth re-emphasizing the key differences between isolation and quarantine. As Part II of this Comment demonstrates, the distinction is often ambiguous among existing caselaw and scholarly sources in the field of law. For the purpose of this analysis, we will consider isolation as a less restrictive infringement on individual rights than quarantine. This Comment attempts to be as precise as possible in categorizing isolation and quarantine differently, including when analyzing sources and cases that treat the two as the same.

*A. Temporal Concerns*

A crucial aspect of the proposed future pandemic detection architecture that will likely be subject to legal challenges is time-related uncertainties. In order for the overall early pathogen-catching monitoring framework to function smoothly, authorities need to be able to isolate individuals who test positive for the new pathogen as early as possible. However, current laws make this objective difficult to implement in practice on several levels.

For a starting point, as Section II of the Comment indicates, the question of “how soon can individuals be ordered to legally go through mandatory isolation in a pandemic?” does not always have a clear answer. A number of U.S. states require the state to be in an official state of emergency before state health authorities can legally mandate isolations (and quarantines).<sup>52</sup> Although not all states have this requirement as part of their public health statutes,<sup>53</sup> this is a challenge that would need to be overcome, because by its design, the “test-and-isolate” framework aims to isolate the individuals it deems threatening to the community’s public health as early as possible so that the state would not face a state of emergency in the first place. It would be contrary to the proposed system’s objective if one were to wait until the threat gets as serious as a state of emergency to begin isolating the individuals who will likely pose public health risks by testing positive for the newly-detected pathogens.

In states that do not specify how soon one could be ordered to undergo involuntary isolation, the relevant statutes are usually either silent or ambiguous on this issue. In terms of the relevant legal authority at the federal level, recall that § 264(d)(2) defines “qualifying stage” for involuntary isolation/quarantine to encompass the “pre-communicable stage,” which might be welcome news for Ecker and those who embrace his future pandemic response architecture.<sup>54</sup> In order to qualify, however, the disease would have to “be likely to cause a public health emergency if transmitted to other individuals.”<sup>55</sup> How likely would suffice as “likely” enough under this federal standard is unclear. It cannot be taken for granted that the “isolate” portion of the “test-and-isolate” strategy could survive the federal test in order to be successfully implemented. This is because, during this initial phase of the

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52. See NAT’L CONF. STATE LEGISLATURES, *supra* note 26.

53. See *id.*

54. 42 U.S.C. § 264(d)(2).

55. *Id.*

pandemic response and prevention process, it could be scientifically challenging to predict how likely the new pathogen might cause a public health emergency that merits the relative extreme measure of medical isolations. Gostin and his co-authors would probably be skeptical based on their view that isolation and quarantine should be the last resort due to the level of civil liberty infringement.<sup>56</sup>

Indeed, a key downside of the swift response of the proposed model to new pathogens is that there are a number of medical uncertainties that will not work well with the current legal standards. First, the recommended length of medical isolation for any given novel pathogen would likely be unknown, as the disease incubation period would probably be unknown at this early stage of detection. Under the traditional pandemic response model, epidemiologists examine cases based on their geographical distribution; they form hypotheses and may be able to calculate a mean or median incubation period by comparing the known illness date and exposure date with “what is already known for certain suspected pathogens (most useful when the pathogen is unknown).”<sup>57</sup> Ecker has not specified concrete quantitative details on what sample size of novel pathogen carriers he is envisioning for the “test-and-isolate” system, nor does he provide further information on how the method he proposes differs from traditional ones.<sup>58</sup> This means that it could be difficult to rigorously predict the incubation period at the early stage of the process when Ecker does strongly advocate starting to isolate individuals. Unlike in *Hickox*, where the incubation period of Ebola was known to be up to 21 days,<sup>59</sup> in the novel pathogen context, it will be logistically difficult to impose a specific number of days as the isolation period due to this key uncertainty in the medical sciences. Although courts understand the significance of public health needs, this unknown variable could likely be a hurdle when health authorities strive to justify the appropriate length to isolate someone under the “test-and-isolate” model.

Second, the symptoms of the new potentially communicable disease may not be entirely clear. Ecker’s model proposes an active search for severe respiratory/cold-like symptoms, which are symptoms for a number of known pandemic-causing diseases,

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56. See Gostin et al., *supra* note 30.

57. MARK S. DWORKIN, *OUTBREAK INVESTIGATIONS: CASE STUDIES IN INFECTIOUS DISEASE FIELD EPIDEMIOLOGY* 7 (2010).

58. See Ecker, *supra* note 5.

59. *Hickox v. Christie*, 205 F. Supp. 3d 579, 587–88 (D.N.J. 2016).

including the Spanish Flu, H1N1 swine flu, Ebola, and COVID-19.<sup>60</sup> However, there is no guarantee that a future novel pathogen will trigger similar symptoms, so the model could potentially underpredict the likelihood of new pandemics. Either underpredicting or over-predicting can have negative consequences legally, socially, economically, and politically.

Third, along those lines, the severity of the disease from the novel pathogen will also probably be unknown. The fatality of Ebola is, as discussed, a factor in the *Hickox* case that the court considered in upholding the mandatory isolation and quarantine of the plaintiff, although legal standards are still somewhat ambiguous regarding the requisite level of severity of a given disease.<sup>61</sup> Given the law's general obsession with key principles such as necessity and proportionality in balancing between public health needs and individuals' civil rights (e.g. Fourteenth Amendment rights), this unknown factor will likely raise many an eyebrow among judges, legal academics, and others. Gostin and his co-authors, who caution against "large-scale quarantines<sup>62</sup> imposed without any individualized risk assessment,"<sup>63</sup> may demand a less restrictive option. This Comment nevertheless recommends the legal and medical community alike give the "test-and-isolate" model serious thought as a creative proposal that could solve a century-long problem that has haunted the global community repeatedly.

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60. See, e.g., *Spanish Flu*, HISTORY (May 19, 2020), <https://www.history.com/topics/world-war-i/1918-flu-pandemic> [https://perma.cc/2SMP-6BV4]; *Questions and Answers: 2009 H1N1 Flu (Swine Flu) and You*, CDC (Feb. 10, 2010, 5:00 PM), <https://www.cdc.gov/h1n1flu/qa.htm> [https://perma.cc/G5G5-3SKF]; Rebecca M. Mingo, James A. Simmons, Charles J. Shoemaker, Elizabeth A. Nelson, Kathryn L. Schornberg, Ryan S. D'Souza, James E. Casanova, & Judith M. White, *Ebola Virus and Severe Acute Respiratory Syndrome Coronavirus Display Late Cell Entry Kinetics: Evidence that Transport to NPC1+ Endolysosomes Is a Rate-Defining Step*, 89 J. VIROLOGY 2931 (2015); *Coronavirus Disease 2019 (COVID-19)*, MAYO CLINIC, <https://www.mayoclinic.org/diseases-conditions/coronavirus/symptoms-causes/syc-20479963> [https://perma.cc/8PDJ-42RQ] (last visited June 18, 2021).

61. See *Hickox*, 205 F. Supp. 3d at 587–88. Note that in *Hickox*, the nurse had direct exposure to Ebola patients and the fatality of the disease was publicly known. On the other hand, while *Hickox* registered a fever—a known symptom of Ebola—she ultimately tested negative for Ebola, yet the court still considered medical isolation and quarantine to be appropriate. See generally *id.*; see also *supra* Part II. The *Hickox* holding can support Ecker's proposed model in terms of the isolation recommendations, but to a limited degree considering all the nuanced differences in the fact pattern when compared against the future pandemic response model.

62. This likely includes isolations, since the word "quarantine" was used fairly broadly.

63. Gostin et al., *supra* note 30.

### B. Federal vs. State Concerns

Temporal considerations aside, Ecker's proposal also implicates concerns about federal and state authority. As Section II of this Comment suggests, there is some overlapping authority in federal and state powers to mandate quarantines, with federal power being "permissive, rather than mandatory."<sup>64</sup> There is a degree of messiness and uncertainty regarding what authority is ultimately responsible for which aspects of mandatory isolations in the pandemic response context. Firstly, as stated, different states have distinct statutes regarding medical isolations and quarantines, and the discrepancy will likely continue to exist.<sup>65</sup> For the "isolate" portion of the "test-and-isolate" model, however, this feature of the American health law system could be problematic, because the proposed network of 200 metropolitan hospitals running metagenomic tests that are spread out across the country necessitates strong coordination and monitoring between the federal and state levels, as well as effective interstate communications on a timely basis.<sup>66</sup> Uniformity and consistency are critical to the proposed future pandemic prevention model's success: Ecker regards "real-time central monitoring" based on the metagenomic test results from individual hospitals as a crucial part of a rapid public health response.<sup>67</sup> The current system and legal structure in place do not easily facilitate such coordination.<sup>68</sup>

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64. Professor Lindsay Wiley Shares Insights on Health Policy Amid the Pandemic During "WCL Faculty Speaks: COVID-19 and Public Health Law," AM. UNIV. (June 11, 2020), <https://www.wcl.american.edu/news-events/news/professor-lindsay-wiley-shares-insights-on-health-policy-amid-the-pandemic-during-wcl-faculty-speaks-covid-19-and-public-health-law/> [<https://perma.cc/K9TV-D62W>].

65. See *supra* Section II; See, e.g., NAT'L CONF. OF STATE LEGISLATURES, *supra* note 26; Gostin et al., *supra* note 30. Hickox's New Jersey and Maine lawsuits, for example, had different outcomes. Compare *Hickox v. Christie*, 205 F.Supp.3d 579 (D.N.J. 2016), with *Mayhew v. Hickox*, No. CV-2014-36 (Me. Dist. Ct., Fort Kent, Oct. 31, 2014).

66. See Ecker, *supra* note 5.

67. *Id.*

68. Moreover, the interplay between the federal and state authorities also calls into question how the different authorities will be delegating responsibility. My own theory is that this is not likely a case where various levels of government compete for power, but rather one where one might prefer the other to take fuller responsibility given the limited time and resources different branches of government have. One should be cautious of a scenario where each level of government attempts to evade accountability: after all, no one especially enjoys restricting residents' freedoms; it can be politically unsavory, especially in election years. See, e.g., Lawrence O. Gostin & Meryl Justin Chertoff, *Lockdowns, Quarantines, And Travel Restrictions, During COVID And Beyond: What's The Law, And How Should We Decide?*, HEALTH AFFAIRS (Mar. 24, 2021), <https://www.healthaffairs.org/doi/10.1377/hblog20210322.450239/full/> [<https://perma.cc/4LW2-SXEV>].

Furthermore, the current legal authority for medical isolations in the context of contagious disease response and prevention appears to be derived from laws that were not designed for these purposes. It may appear rather odd that the federal authority is based on the Commerce Clause, while the state power to order mandatory isolations is from states' police power.<sup>69</sup> Judging by their names alone, neither the Commerce Clause nor police power is directly relevant to public health. The Commerce Clause origin of the federal power, for example, does place its own restrictions in shaping the focal point of most legal precedent involved in the analysis: international and inter-state air travel.<sup>70</sup> International and inter-state travel is a particular sub-topic of medical isolations in the pandemic context, but one that is not directly relevant to the "test-and-isolate" model, which is primality concerned with local cases that could involve novel pathogens. *Hickox*, for instance, was fundamentally concerned with border-crossing, as the plaintiff traveled back to the U.S. from abroad, and then traveled from New Jersey to Maine.<sup>71</sup> The fact pattern in the "test-and-isolate" model would not be nearly as concerned with the international/interstate components, which means that the applicability of prevalent legal precedent is limited in scope due to the fundamental differences in the geographic aspects.

*C. Zooming Out: the General Flaws of U.S. Public Health Law Applied to this Context*

This Comment opened with the analogy of forest fires to demonstrate the philosophy behind the future pandemic prevention landscape. To use another forest metaphor, one needs to see both the forest and the trees: having examined individual components of the relevant laws on the isolation piece of the future pandemic response strategy, we now briefly look at the broader picture—American public health law being the larger forest. Are there unique attributes of the U.S. public health law system that render it especially difficult to implement the "test-and-isolate" model, given that we have already identified a number of potential obstacles?

In his book *Public Health Law: Power, Duty, Restraint*, Gostin emphasizes three general problems with the U.S. public health law

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69. See *supra* Section II.

70. *Id.*; see also Gostin et al., *supra* note 68.

71. *Hickox v. Christie*, 205 F.Supp.3d 579, 585–88 (D.N.J. 2016).

system: antiquity, multi-layered authority, and inconsistency.<sup>72</sup> These problems are relevant to the topic explored in this Comment. First, Gostin critiques public health law, which was framed in the late-nineteenth to early/mid-twentieth centuries, as not reflective of “contemporary scientific understandings of injury and disease or legal norms for protection of individual rights,” because when relevant statutes were written, epidemiology, biostatistics, and behavioral sciences, for example, “were in their infancy.”<sup>73</sup> Applied to the context of this project, the proposed pandemic detection architecture uses cutting-edge technologies, such as contact tracing, computational infrastructure, and metagenomic sequencing.<sup>74</sup> Old health laws generally did not have these in mind since they were designed to react to pandemics.

Second, Gostin considers it troublesome that “the disparate legal structures of state public health laws can significantly undermine their effectiveness,” especially in state health codes in the infectious disease context.<sup>75</sup> Communicable disease laws were primarily “enacted piecemeal in response to specific epidemics, they tell the story of the history of disease control”; subsequently, “laws enacted in such an ad hoc fashion are often inconsistent, redundant, and ambiguous.”<sup>76</sup> Applied here, the pandemic response architecture advocated by this Comment will have the capacity to catch new pathogens, regarding which science will confront itself with various uncertainties in the short term—the length of effective isolations and quarantines, for example, will likely be unknown.<sup>77</sup> It is concerning, therefore, that the law seems to be disease-specific and is already “inconsistent, redundant, and ambiguous.”<sup>78</sup>

Third, Gostin believes that “public health laws remain fragmented not only within states[,] but also among them.”<sup>79</sup> Specific to the medical isolation context for pandemics, this is consistent with the findings of Roni Adil Elias<sup>80</sup> that, firstly, “few formal structures exist to assure coordinated action among officials at

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72. LAWRENCE O. GOSTIN, *PUBLIC HEALTH LAW: POWER, DUTY, RESTRAINT* 24 (2d ed. 2008).

73. *Id.*

74. *See* Ecker, *supra* note 5.

75. GOSTIN, *supra* note 72.

76. *Id.* Examples include “smallpox, yellow fever, cholera, tuberculosis, venereal diseases, polio, HIV/AIDS, West Nile virus, and SARS.” *Id.*

77. *See supra* Section III(A).

78. GOSTIN, *supra* note 72.

79. *Id.*

80. Roni Adil Elias is an author who has published numerous pieces related to contagions.

different levels of government,” and secondly, “regardless of whether public health powers and policy are effectively coordinated on a national level, the law establishing authority for public officials is often ill-defined.”<sup>81</sup> This is especially fatal in the “test-and-isolate” model we have in mind, where effective coordination and consistency among facilities in different states are critical to the proposed pandemic prevention system’s success.<sup>82</sup>

The next section of this Comment attempts to synthesize the key contributions and findings while concluding on a forward-looking note, including a few recommendations for reforms.

#### IV. SYNTHESIS AND RECOMMENDATIONS: THINKING AHEAD TO PREVENT THE NEXT PANDEMIC

It may be commonsensical that to prevent a future forest fire that could destroy many lives and homes, one would “survey aggressively for smaller brush fires and stomp them out immediately.”<sup>83</sup> Similarly, one should not be surprised by the suggestion that to prevent a future pandemic that could rival COVID-19 in its public health, economic, and social consequences, public health authorities should try their very best at detecting potentially dangerous pathogens as early as possible and halting them as soon as they can.

Ecker’s pandemic prevention architecture shows promising potential as a creative solution to harness the power of the latest technological advances to solve this centuries-old problem to humankind. By identifying and reflecting on a myriad of legal challenges that the “test-and-isolate” model may face in relation to current U.S. medical isolation laws on both the federal and state level, this Comment hopes to inspire further conversations among public health, legal, and interdisciplinary experts to collaborate on ways to overcome these legal challenges.<sup>84</sup> It will be fitting to

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81. Elias, *supra* note 16.

82. See *supra* Section III(B).

83. Ecker, *supra* note 5.

84. Law review articles on health law in the pandemic context have focused on previous and current pandemics instead of future ones. This Comment attempts to stimulate subsequent research and conversations on this topic. As mentioned, this Comment specifically focuses on the “isolate” part of the “test-and-isolate” model. The “test” part is equally important when it comes to legal issues and challenges surrounding the testing aspects involved in Ecker’s model in order for it to be implemented. Possible topics for further research include (i) whether in the absence of a pandemic, consent and information are needed to run such genotyping of pathogens rather than it being routine care, and (ii)

conclude this Comment with a few forward-looking recommendations for possible reform options.

Firstly, the federal and local government should actively consider creative solutions such as Ecker's by incentivizing research projects that incorporate the latest scientific and technological developments in brainstorming options to prevent future pandemics as early as possible. Specific to Ecker's proposal, scholars and practitioners should consider researching ways to help shed light on information needed to make the decisions to mandate medical isolation, including (i) the severity of the disease in the individuals in whom a novel pathogen is initially detected, and (ii) if there is an estimate of how contagious the new disease is, e.g. based on testing information or other types of outbreak monitoring, such as sewage sequencing and traveler sequencing. Although information such as these will be difficult to uncover, resources can be spent up-front to, at a minimum, discover more efficient ways to answer these pressing questions in relation to the legal standards addressed in this Comment.

In his recent interview with *The Harvard Crimson*, Michael Mina, an epidemiologist at the Harvard T.H. Chan School of Public Health, advocated for an early-warning system that is similar to Ecker's proposed "test-and-isolate" framework.<sup>85</sup> He offers creative solutions from the scientific perspective in this interview, suggesting that it is feasible to implement an efficient blood-testing based system for this pandemic prevention architecture.<sup>86</sup> Mina believes that there needs to be a "whole new way of thinking" and would like to start a new field that he calls "public health engineering," because "ultimately, the response to an outbreak has to be engineered."<sup>87</sup>

Secondly, Gostin and his co-authors believe that voluntary isolations and quarantines can be effective solutions.<sup>88</sup> However, as the COVID-19 crisis has shown, some individuals have been

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questions of payment for physicians, tests themselves; e.g. whether there are reliable models for this that existed pre-Covid-19, and if so, how consent and payment work, etc.

85. Alvin Powell, *A Key to the Next Pandemic: An Early-Warning System*, THE HARVARD GAZETTE (May 19, 2021), [https://news.harvard.edu/gazette/story/2021/05/michael-mina-shares-insight-on-how-to-prevent-another-pandemic/?utm\\_source=SilverpopMailing&utm\\_medium=email&utm\\_campaign=Daily%20Gazette%2020210520%20\(1\)](https://news.harvard.edu/gazette/story/2021/05/michael-mina-shares-insight-on-how-to-prevent-another-pandemic/?utm_source=SilverpopMailing&utm_medium=email&utm_campaign=Daily%20Gazette%2020210520%20(1)) [<https://perma.cc/SH2V-KNJW>].

86. *Id.*

87. *Id.*

88. See Gostin et al., *supra* note 30.

reluctant to comply with even mandatory orders.<sup>89</sup> Nevertheless, one way to incentivize members of society to isolate or quarantine themselves more voluntarily might be offering financial incentives. New Jersey, for instance, offers job protection and compensation to persons under medical isolation or quarantine.<sup>90</sup>

To Mina, “the way that we communicate public health to the public needs to change” and needs to have campaigns that are on par with those of large for-profit corporations such as Coca-Cola.<sup>91</sup> The COVID-19 pandemic has already been a \$16 trillion hit on the U.S. economy; it would be cost-efficient, to say the least, for the U.S. government to devote \$2 billion into a marketing and awareness-raising campaign to encourage greater public compliance where the law does not necessarily do so.<sup>92</sup> Teaching individual members of society about public health will be an essential way to facilitate voluntary isolations and quarantines for the public’s health priorities at large.<sup>93</sup> Fortunately, Mina does find that the new generation of young people are “more engaged with each other”<sup>94</sup> and expresses hope that the growing interest in public policy in infectious disease dynamics will drive this new generation to energetically rally around to build grassroots awareness-raising campaigns on public health.

In considering further reform options, one should keep Gostin’s three general critiques on U.S. public health law in mind by being responsive to new technological advances—ideally not only current technologies, but also future ones, being more consistent and less redundant or ambiguous,<sup>95</sup> and facilitating strengthened

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89. See, e.g., Christopher Brito, *Spring Breakers Say Coronavirus Pandemic Won’t Stop Them From Partying*, CBS NEWS (Mar. 25, 2020 10:05 AM), <https://www.cbsnews.com/news/spring-break-party-coronavirus-pandemic-miami-beaches/> [<https://perma.cc/J83G-JA5J>].

90. See N.J. Stat. § 26:13-16 (2005) (“Any person who has been placed in isolation or quarantine pursuant to an order of the commissioner and who at the time of quarantine or isolation was in the employ of any public or private employer, other than a temporary position, shall be reinstated to such employment or to a position of like seniority, status and pay . . .”). Specifics may fall more within the scope of employment law. I defer to experts regarding the details.

91. Powell, *supra* note 85.

92. *Id.*

93. *Id.*

94. *Id.*

95. See, e.g., Wendy E. Parmet, *Quarantining the Law of Quarantine: Why Quarantine Law Does Not Reflect Contemporary Constitutional Law*, 9 WAKE FOREST J.L. & POL’Y 1, 16 (2018) (discussing the Model State Emergency Health Powers Act (MSEHPA)); Stephanie Cooper Blum, *Federalism: Fault or Feature—An Analysis of Whether the United States Should Implement a Federal Pandemic Statute*, 60 WASHBURN L.J. 24 (2020); Cara M. Passaro,

coordination among health authorities across states nation-wide. With greater collaboration among experts across disciplines, we will be better positioned to prevent the next pandemic for the world at large.