

## **Provoking Barriers: The 2014 Ebola Outbreak and Unintended Consequences of WHO's Power to Declare a Public Health Emergency**

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*One aim of the World Health Organization's (WHO) International Health Regulations (IHR) 2005 is to discourage the use of overly restrictive barriers because these measures incentivize outbreak concealment and undermine outbreak response efforts. Yet, during the 2009 H1N1 pandemic and the 2014 Ebola outbreak, close to 25% of states imposed trade and travel barriers in opposition to WHO recommendations. This article argues that WHO's declaration of a Public Health Emergency of International Concern (PHEIC)—in the absence of raising the costs of disregarding WHO recommendations—may actually exacerbate the long observed relationship between an outbreak being made public and governments' imposition of excessive measures. Original data from the 2014 Ebola outbreak supports this argument and illustrates that, paradoxically, the act of declaring a PHEIC, which is intended to alert and prepare the international community, actually provokes some states to overreact. As the revised IHR approach their 10-year anniversary and WHO elects its next director-general, this study points to the PHEIC declaration as an area of needed reform.*

### **INTRODUCTION**

The election of the next director-general of the World Health Organization (WHO) coincides with the 10-year anniversary of the revised International Health Regulations (IHR) entering into force. How have the regulations performed and what does the future hold for the only global agreement governing the international response to disease outbreaks?

The revised IHR, adopted by WHO member states in 2005, are meant to coordinate the global response to health emergencies and were initially heralded as “an historic development for international law and public health.”<sup>1</sup> Yet, the response to four declared public health emergencies of international concern (PHEIC)—the 2009 H1N1 pandemic, 2014 resurgence of Polio, 2014 Ebola crisis, and 2016 outbreak of Zika—reveal uneven success for the regulations.

Since their inception in 1951, the IHR (then called the International Sanitary Regulations, ISR) have had a dual goal of achieving “maximum security against the international spread of diseases with a minimum interference with world traffic.”<sup>2</sup> Yet, states have frequently interfered with trade and travel during outbreaks, imposing measures that are more restrictive than the IHR allowed. For example, in response to a 1965 outbreak of cholera in Iran, Afghanistan, Uzbekistan, and Iraq, 33 countries imposed overly restrictive measures ranging from requiring vaccination certificates to prohibiting importation of foodstuffs and barring entry to travelers from affected states.<sup>3</sup> And, during outbreaks of plague in India and cholera in Peru in the 1990s, a number of states immediately imposed barriers against travel and goods from the two countries that were, again, more restrictive than the IHR allowed.<sup>4</sup> Discouraging this behavior by states was a key motivation behind revising the IHR in 2005 and a number of changes were made to the regulations with this aim in mind.<sup>5</sup>

The use of overly restrictive trade and travel barriers during outbreaks undermines outbreak response in several ways: barriers disrupt international travel and trade, inhibit the free movement of people and resources from getting where they are needed during an

outbreak, and further weaken economies already struggling to deal with a public health emergency.<sup>6</sup> Importantly, barriers also lead to a collective action problem that makes all states less secure from outbreaks in the long run. States that discover outbreaks have incentives to conceal them since other states cannot credibly commit to not impose excessive measures once an outbreak is made public. Not surprisingly, states will not rapidly and transparently report outbreaks if economic harm is their reward.<sup>7</sup> This is problematic given that effective outbreak response relies on rapid and transparent outbreak reporting.

Since outbreaks are associated with many unavoidable costs including increased health care expenditures and lost productivity,<sup>8</sup> limiting the unnecessary cost of other states' trade and travel barriers that do little to stop disease spread is critical. Yet, even after the revised IHR entered into force in 2007, many states continue to impose overly restrictive trade and travel barriers in response to global health emergencies. The H1N1 pandemic and the Ebola crisis suggest that a key aim of the revised IHR is not being met. In spite of changes made to the IHR in 2005 to discourage the use of overly restrictive travel and trade barriers during public health emergencies, during both outbreaks close to 25% of countries ignored WHO guidance and imposed measures that the organization said had little public health rationale.

During the first test of the IHR, the 2009 H1N1 outbreak, 47 states imposed trade or travel barriers against H1N1-affected states, even though WHO recommended against doing so.<sup>9</sup> For its part, WHO did little to address this bad behavior. The 2014 Ebola crisis revealed a similar pattern. Over forty countries imposed travel restrictions against states with Ebola transmission, again ignoring WHO guidance that such measures would not be an effective strategy for fighting the outbreak.

Existing analysis of the use of barriers during H1N1 shows that domestic political incentives drove some states to ignore WHO guidance.<sup>10</sup> But, the H1N1 pandemic also points to another dynamic: most states that imposed barriers did so soon after WHO declared H1N1 a public health emergency. A similar pattern emerged during the Ebola outbreak. Almost half of the states that imposed barriers did so within two weeks or so of WHO's declaration of a public health emergency. In the case of Ebola, this pattern of behavior is especially curious since the outbreak had reached crisis levels well before WHO's announcement and many public health experts argued at the time that the conditions for declaring a PHEIC had been met weeks before WHO did so.<sup>11</sup>

Does WHO's declaration of a PHEIC, which is meant as a warning and call to action for the international community to effectively contain an outbreak, actually provoke trade and travel barriers? Several after-action reviews pointing to failures in the Ebola response have hinted at this possibility.<sup>12</sup> But, is WHO's declaration of a PHEIC really triggering the use of excessive measures by states? If so, what are the options for improvement as WHO heads into its next phase?

This article argues that WHO's declaration of a PHEIC can lead to this unintended outcome. The revised IHR have strengthened WHO's role as an information provider by allowing the organization to provide timely information about whether a global outbreak is occurring and how states can effectively respond. Indeed, many states do not impose trade and travel barriers once informed by WHO that such measures provide little protection and undermine outbreak preparedness and response. However, information provision alone is unlikely to effectively address the cooperation problem driving many governments' continued imposition of barriers. Though all states share an interest in limiting the use of excessive measures to improve outbreak response, when an outbreak actually occurs, conditions change for some governments that face shorter-term international and/or domestic political pressures to impose barriers. The IHR have done little to directly address these incentives. As such, in the absence of higher costs for disregarding WHO recommendations, a PHEIC declaration signaling that a serious outbreak is underway actually exacerbates the long observed relationship between outbreaks being made public and the imposition of barriers.

Analysis of original data from the 2014 Ebola outbreak supports this argument: only two states imposed barriers before WHO declared Ebola a PHEIC and the highest number of barriers were imposed in the first two weeks after the declaration, even accounting for the severity of the outbreak and the level of media attention on the outbreak. Paradoxically, the act of declaring a public health emergency, which is intended to facilitate effective outbreak response, may actually undermine that effort by provoking barriers.

The article proceeds as follows. The next section provides an overview of the purpose of the IHR and key changes made to the regulations in 2005. The third section explains the relationship between declaring a PHEIC and the imposition of barriers. The following section reviews the data, methodology, and results. The fifth section concludes with an evaluation of recent proposals for reform in the context of these findings.

## THE IHR AND LIMITING EXCESSIVE MEASURES

The relationship, and tension, between disease outbreaks and the free movement of people and goods came to the fore nearly 100 years before WHO's 1948 founding. Several developments in the early 19<sup>th</sup> century including increased migration and expanded trade and shipping between Europe and Asia facilitated the spread of disease.<sup>13</sup> The first of seven cholera pandemics of the late 19<sup>th</sup> century broke out in the 1820s, spreading from India to Europe. Yellow fever also spread across Africa and Latin America at this time. In response, a patchwork of quarantine regulations, including forced confinement, ship inspections, and bill of health requirements proliferated, hindering commerce and inconveniencing travelers. In spite of these restrictions, both diseases still spread widely.<sup>14</sup>

On this backdrop, 12 European states convened the first International Sanitary Conference in 1851 with the goal of harmonizing quarantine policies. The central aim of today's IHR can be traced back to this first conference. In spite of disagreements about how disease spread,<sup>15</sup> all states at the conference wanted protection from disease with minimum interference in traffic and trade. State participants at the conference agreed that states should only impose *effective* public health measures at ports and avoid unnecessary interference with commerce; but because of different understandings of the science behind disease, they disagreed over the types of measures that would effectively prevent disease spread.<sup>16</sup>

When WHO member states adopted the International Sanitary Regulations a century later in 1951, providing protection from disease while maintaining the free flow of people and goods remained the central goal.<sup>17</sup> As such, the regulations laid out "the maximum measures applicable to international traffic, which a State may require for the protection of its territory against the quarantinable diseases."<sup>18</sup> And, states could submit disagreements over the application of the ISR to the director-general.<sup>19</sup>

Yet, as the above-described examples of cholera in 1965 and the 1990s outbreaks of plague and cholera illustrate, states frequently imposed trade and travel measures that were more restrictive than the regulations allowed.<sup>20</sup> In part due to the threat of economic harm, delayed outbreak reporting was also a persistent problem—one that the 2002 outbreak of Severe Acute Respiratory Syndrome (SARS) placed on the global stage. In recognition of the many issues caused by the imposition of overly restrictive trade and travel barriers, limiting their use by states was a key goal of revising the IHR in 2005.

Several changes were made to the IHR in 2005 to address this and other weaknesses in the regulations, which had come to be seen as "outdated and notoriously ineffective."<sup>21</sup> The full scope of the revision has been discussed at length elsewhere.<sup>22</sup> Five changes worth noting here include: 1) expanding the scope of the regulations to cover a broader range of health events referred to as Public Health Emergencies of International Concern (PHEIC); 2) giving WHO authority to declare when a PHEIC is underway; 3) allowing WHO to make non-binding recommendations about how states should respond to these events, including

limiting the use of “excessive measures” like trade and travel barriers deemed to not actually prevent disease spread in a given case; 4) allowing WHO to rely on non-state sources of information about potential outbreaks; and 5) giving WHO authority to publicize states’ failure to report potential public health emergencies or the imposition of excessive measures.

Taken together, these revisions aim to facilitate rapid response to global health emergencies while discouraging the use of excessive measures once an outbreak is reported. Yet, in spite of these changes, as the H1N1 and Ebola outbreaks demonstrate, many states continue to impose overly restrictive trade and travel barriers, often soon after WHO’s declaration of a PHEIC. What accounts for this observed pattern of behavior?

### **EXACERBATING THE RELATIONSHIP BETWEEN OUTBREAK REPORTING AND BARRIERS**

The following discussion shows that the IHR have not been designed or implemented in a way that would address the cooperation problem motivating some states to impose excessive measures. As such, WHO’s expanded information provision role under the revised IHR can actually exacerbate the long observed connection between an outbreak being made public and the imposition of overly restrictive measures.

There are several potential explanations for why some countries follow WHO recommendations and others continue to impose excessive measures. Some states may refrain from imposing barriers for reasons that are unrelated to WHO’s recommendations—perhaps some states never consider imposing barriers regardless of their commitments to the IHR. Or, maybe governments see it as in their domestic or international interests to follow through with commitments to the IHR and abide by WHO guidelines. Another possibility is that states refrain from imposing barriers because WHO recommendations have provided them with needed information about which measures will (and will not) constitute an effective response to a given outbreak. For these states, WHO has solved a *coordination problem*. Coordination problems exist when all share a strong interest in collective action and have an overriding preference for a common end—in this case, effective outbreak response—but lack information about how to best work together to achieve that shared goal.<sup>23</sup>

In the case of the IHR, since their founding in 1951 the regulations have always been designed to address such issues of information provision and coordination. Overcoming information deficits and coordination problems requires an organization with technical expertise to provide guidance, in this case, about what an effective response looks like. Until revision in 2005, the regulations specified the maximum measures that states should impose in response to diseases covered by the IHR. And, the 2005 revisions strengthened the regulations on this count by expanding the scope of the health events covered by the IHR, giving WHO authority to let states know when a “public health emergency of international concern” is occurring, and allowing the organization to make *real-time* recommendations about how states should (and should not) respond to these events.

These changes ensured that WHO could quickly provide relevant information to states about how they should respond to a range of pressing health threats as they evolve over time. Governments have clear reasons to follow WHO guidance during an outbreak because, as with all coordination problems, defection is self-defeating from the perspective of outbreak preparedness and response.<sup>24</sup> As described above, imposing overly restrictive trade and travel barriers makes all states less secure from outbreaks in several ways, most directly by disincentivizing rapid and transparent outbreak reporting by governments.

States cannot be expected to respond effectively to an outbreak if they do not know what constitutes an effective response. Though some states may still be uncertain about how to respond to outbreaks even with WHO recommendations, WHO’s expanded information provision role under the revised IHR has likely helped many governments that want to

cooperate adopt appropriate policy. Once provided with guidance from WHO, many countries follow it and do not impose excessive measures.

Yet, as recent outbreaks demonstrate, compliance is not universal; some countries disregard WHO recommendations. A central reason is that some governments face strong shorter-term domestic and/or international pressures to impose barriers that outweigh their interest in effective outbreak response.<sup>25</sup> Though in general all states are in favor of limiting the use of barriers to encourage early reporting and facilitate effective outbreak containment, when an outbreak occurs, conditions change for some states, leading them to forgo this longer-term collective good in favor of short-term incentives. This sort of situation represents a *cooperation problem* because states have time-inconsistent preferences that create incentives to engage in opportunistic behavior even after an agreement has been made.<sup>26</sup> Unlike the coordination problem described above, addressing these kinds of cooperation problems require more than just information provision.

For such states to follow WHO recommendations, they must anticipate costs for renegeing on their commitments to the IHR. In other words, to convince states that following WHO recommendations is in their interests, the cost benefit analysis must be shifted in favor of the collective good. This can be achieved in various ways through legalized agreements and institutions that have relatively high levels of delegation, precision, and obligation.<sup>27</sup> Violation can mean harm to a state's reputation in the international community, which can mean losing aid, trade, or security benefits, or a reduction in other states' willingness to cooperate with the violator in the future.<sup>28</sup> Violation can also harm leaders' domestic political standing, especially if the domestic population values the rule of law or if violation harms the interests of a domestic constituency.<sup>29</sup> These costs will be higher and more likely if the IO administering the agreement has the power to "name and shame" countries that do not adhere to the agreement (and exercises that power), or if there is a formal dispute resolution mechanism attached to the agreement, as is the case with the World Trade Organization. Of course, as the case of the IHR demonstrates, many cooperation problems persist in part because of states' unwillingness to bind themselves to a hard law agreement that might actually constrain their behavior.<sup>30</sup>

As outlined in the previous section, the 2005 IHR revision did make it possible to raise the costs of disregarding commitments to the IHR by giving WHO the authority to monitor whether states followed its recommendations and to publicize which states imposed measures not called for by the organization. Publicizing bad behavior could raise the costs of not following WHO recommendations in several ways. First, it could threaten states with general harm to their international reputation. Second, it could legitimize bilateral punishment by states harmed by the excessive trade and travel barriers. Third, it could mobilize domestic groups that are harmed by barriers to pressure their governments to comply (such as pork importers during the H1N1 pandemic harmed by bans placed by their governments on pork imports from H1N1-affected states). However, WHO did not exercise its naming and shaming power during either the H1N1 pandemic or the Ebola outbreak, even though in both instances over 40 countries imposed measures not called for by the organization.<sup>31</sup>

WHO's hesitance to call states out for bad behavior is understandable given its continued reliance on member countries for financial support and cooperation.<sup>32</sup> Still, failing to name and shame states for imposing excessive measures means that these states suffer few costs for doing so. There is also little evidence of bilateral punishment by countries themselves. For example, during the H1N1 pandemic, because it had one of the highest numbers of H1N1 cases, the US was the target of most pork import bans imposed by other countries. Though the US did warn countries to remove the bans, there is no evidence that the US followed through with any sort of punishment (though this warning alone may have been enough to convince some states to not impose barriers).<sup>33</sup> In short, states may have learned from the H1N1 experience that shirking commitments to the IHR comes with

few costs. As such, governments that face incentives to impose barriers have little reason not to do so.

While the IHR 2005 are, on the whole, more legalized than earlier versions of the regulations, portions of the IHR related to the imposition of excessive measures lack some of the aspects of hard law that might best address the cooperation problem at work.<sup>34</sup> Even though the IHR commits states to follow WHO recommendations unless they provide scientific justification for not doing so, the recommendations are not technically binding on states. Further, the IHR 2005 no longer include a dispute resolution mechanism for states to challenge measures imposed by others.<sup>35</sup>

Of course, states often intentionally use soft law approaches to build in flexibility to institutional commitments. It is often more difficult to get states to sign on to a highly legalized agreement exactly because such an agreement might actually constrain state behavior. There is some evidence from state negotiations over the IHR that at least some states did not want to be bound without exception to follow WHO recommendations.<sup>36</sup> As such, building in flexibility to this part of the regulations may have been a rational decision by states to facilitate reaching an agreement that otherwise would not have been possible.

Yet, the soft law features of states' commitment to follow WHO recommendations, together with WHO's choice not to use its naming and shaming power—the key enforcement tool at its disposal—means that the incentives driving the cooperation problem in the first place persist. States still face few costs for disregarding WHO recommendations. In this context, other revisions made to the IHR in 2005 may have actually exacerbated the cooperation problem.

Specifically, the revised IHR give WHO authority to determine whether a disease event constitutes a PHEIC and then, if it does, to make an official declaration that such an event is occurring (see Article 12). This new authority was meant to address issues related to delayed outbreak reporting by governments and to ensure that the regulations would be flexible enough to apply to a broad array of health threats that will continue to change into the future. The declaration power was meant to serve as a signal to the international community and facilitate an effective response to outbreaks with potential for cross border or even global spread.

But, a declaration from WHO that a global health emergency is underway may also be sending a different sort of signal to some states—a signal to overreact. Given the long observed relationship between an outbreak being made public and the imposition of overly restrictive trade and travel barriers by countries, an authoritative declaration from WHO that a PHEIC is occurring—in the absence of raising the anticipated costs of imposing such measures—may actually exacerbate this relationship. With WHO's authority to declare a PHEIC, governments (and their constituents) are better able to distinguish between disease events. Perhaps this means that fewer states are imposing excessive measures during outbreaks not declared a PHEIC by WHO (one example is the lack of trade and travel barriers imposed against states with cases of Middle East Respiratory Syndrome, which has not been declared a PHEIC); but, declaring a PHEIC signals to states that a serious outbreak is occurring and thus may be provoking barriers during just those events that most require a coordinated international response.

In 2005, states may have strengthened the IHR when it comes to expanding WHO's role as an information provider. But, states also gave WHO the authority to send a strong signal that a serious outbreak is occurring *without* also increasing the anticipated costs for imposing overly restrictive trade and travel barriers, which exacerbates the cooperation problem. If this logic is actually operating, if WHO's declaration is provoking barriers, then we should see evidence of the following two observable implications:

**Hypothesis 1.** Most states should impose barriers after WHO declares a PHEIC, rather than before.

**Hypothesis 2.** The number of states imposing barriers should be highest soon after WHO's declaration.

Importantly, both of these observable implications should hold even when accounting for other factors that might explain the number of states imposing barriers over time, such as the severity of the outbreak itself or the level of media attention paid to the outbreak.

## DATA AND METHODS

To evaluate the above hypotheses, I constructed an original dataset coding whether and when each WHO member state imposed trade or travel restrictions during the 2014 outbreak of Ebola. The Ebola outbreak is well-suited for this analysis because the disjuncture in timing between Guinea's report of the first cases in March 2014 and WHO's declaration of a PHEIC in August 2014 provides a good opportunity to examine the influence of the declaration independent of the severity of the outbreak.<sup>37</sup> The following briefly describes the three analyses I use to evaluate the argument laid out above.<sup>38</sup>

### *Visualizing Barriers Over Time*

I evaluate Hypothesis 1 by plotting barriers, Ebola cases and fatalities, media attention over time, the date of WHO's declaration that Ebola constituted a PHEIC (August 8, 2014), and several other events that could be related to when countries imposed barriers (see Figure 1 below).<sup>39</sup> I use newspaper sources and publicly available government documents to code whether and when each country imposed barriers during the outbreak.<sup>40</sup> When WHO declared Ebola a PHEIC, the IHR Emergency Committee recommended that "there should be no general ban on international travel or trade."<sup>41</sup> WHO did not recommend that states adopt *any* border measures; as such, states that imposed measures like visa restrictions, flight cancellations, or requirements that travelers have a medical certificate proving that they are Ebola-free, are coded as having imposed excessive barriers. I find that 44 states imposed barriers and 150 states did not (see Table 1).<sup>42</sup> I then total the number of states with barriers in place on each day of the outbreak, beginning the day the first cases were reported (March 23, 2014) and lasting through the day after the fourth meeting of the IHR Emergency Committee (January 21, 2015).<sup>43</sup>

### *The Number of States Imposing Barriers over Time*

Next, to evaluate Hypothesis 2, I examine variation in the number of states imposing barriers each day of the outbreak (see Tables 2 and 3). If WHO's announcement sparked the imposition of barriers, we should observe that more states imposed barriers soon after the announcement than at other times, even controlling for other factors. The dependent variable in this analysis is a count of the number of states that *newly* imposed barriers each day of the outbreak;<sup>44</sup> as such, an event count procedure is appropriate.<sup>45</sup> To examine whether the two weeks following WHO's declaration saw higher numbers of barriers than other weeks during outbreak (either before or after WHO's declaration), the key explanatory variables are binary variables for 1) the first week after the declaration, 2) the second week after, and 3) the first two weeks after. To account for other factors that may have led many states to impose barriers during these time periods, I include the extent of global media coverage of the outbreak and the number of Ebola cases and fatalities each day.<sup>46</sup>

**Table 1. States that imposed excessive measures during the 2014 Ebola outbreak (March 23, 2014 - January 21, 2015)**

Antigua and Barbuda	Maldives
Australia	Mauritania
Bahrain	Mauritius
Belize	Namibia
Botswana	Nauru
Cameroon	Nepal
Canada	Panama
Cape Verde	Qatar
Chad	Rwanda
Colombia	Saint Kitts and Nevis
Cote d'Ivoire	Saint Lucia
Dominican Republic	Saint Vincent and the Grenadines
Equatorial Guinea	Sao Tome and Principe
Gabon	Saudi Arabia
Gambia	Senegal
Guinea-Bissau	Seychelles
Guyana	South Africa
Haiti	South Sudan
India	Sri Lanka
Indonesia	Suriname
Jamaica	Trinidad and Tobago
Kenya	Zambia

### *The Potential Role of Domestic Characteristics*

Another important alternative explanation is that heightened fears of disease spread among powerful states, many of which are WHO's biggest donors, may have influenced the timing of WHO's declaration. This increased threat perception could explain why WHO made the declaration *and* why so many countries imposed barriers in the two weeks following the recommendation, which would suggest that the observed relationship between the PHEIC declaration and barriers is spurious. If this were true, then we might expect higher income countries to be particularly likely to impose barriers in the weeks following the declaration. To assess this possibility, I construct a binary dependent variable coded "1" if a state imposed barriers in the two weeks following WHO's declaration and "0" if the country either imposed barriers at another time or never imposed barriers. Using logistic regression, I examine whether either GDP or GDP per capita is associated with state behavior.<sup>47</sup> I also include several other factors that existing research suggests might influence variation in behavior across countries: total health spending, the level of democracy, whether the state imposed barriers during H1N1, and whether the country is located in the UN Africa region (all for 2013, the year before the Ebola outbreak began).<sup>48</sup> I first examine variation across

all 194 states, but since “0” includes states that never imposed barriers, I repeat the analysis after subsetting the data to just the 44 countries that imposed barriers (see Table 4).

## ANALYSIS AND RESULTS

### *The Vast Majority of States Imposed Barriers After WHO’s Declaration*

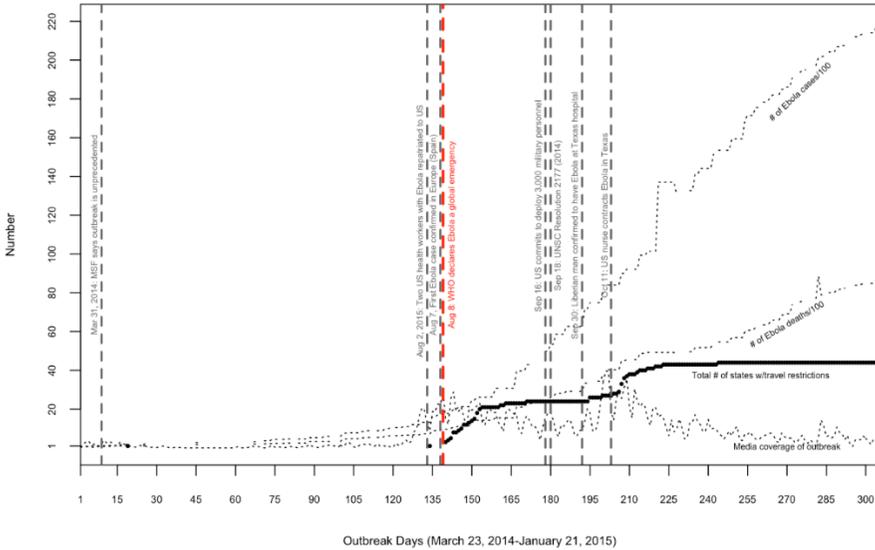
Figure 1 plots the number of Ebola cases and fatalities, media coverage, and the cumulative number of countries with barriers in place each day of the outbreak, along with the date of WHO’s declaration that Ebola constituted a PHEIC (August 8, 2014) and several other events that could be relevant to when countries imposed barriers:

- March 31, 2014: Doctors Without Borders/Médecins Sans Frontières (MSF) warned of an “unprecedented epidemic.”<sup>49</sup>
- August 2, 2014: Two US health workers with Ebola repatriated from Liberia.<sup>50</sup>
- August 7, 2014: First Ebola case confirmed in continental Europe (Spain).<sup>51</sup>
- September 16, 2014: United States commits to deploy 3,000 military personnel.<sup>52</sup>
- September 18, 2014: United Nations Security Council (UNSC) calls the outbreak “a threat to international peace and security.”<sup>53</sup>
- September 30, 2014: Liberian man confirmed to have Ebola at a Texas hospital.<sup>54</sup>
- October 11, 2014: First documented case of local transmission of Ebola in the US.<sup>55</sup>

The figure illustrates several key points. First, as expected, the vast majority of states imposed barriers after WHO’s August 8 declaration that Ebola constituted a PHEIC. Only two states imposed barriers before the declaration—Bahrain on August 4 and Gambia on April 10. In Gambia’s case, the April 10 order to airlines to cancel flights from Guinea, Liberia, and Sierra Leone was removed on May 14. Then, after the PHEIC was underway, on September 3, the Gambian government banned entry of travelers coming from Ebola-affected countries.<sup>56</sup> The 42 other countries that imposed barriers began doing so on August 9, the day after WHO’s PHEIC declaration. And, almost half of the countries that ended up imposing barriers did so in the two weeks following the declaration. More compelling is that the imposition of barriers does not appear to track with the severity of the outbreak. For one thing, many public health experts, including MSF as early as March 31, 2014, argued that the outbreak had reached crisis levels weeks, if not months, before WHO’s declaration.<sup>57</sup> Moreover, the figure shows that about 90 days after WHO’s declaration, no additional countries imposed barriers in spite of the outbreak’s growing severity (measured in cases and fatalities).

Further, the figure suggests that several other events that might have increased perceptions of a growing threat of global spread, especially among high-income countries, do not account for why most countries began imposing barriers on August 9. The repatriation of US health workers from Liberia occurred on August 2, and yet most countries only began imposing barriers the day after WHO’s declaration on August 9. The first case was confirmed in continental Europe on August 7; even though that is only the day before WHO’s declaration, the meetings at WHO to make the declaration were already underway on August 6, before the case was confirmed in Spain.<sup>58</sup> The US commitment to deploy 3,000 military personnel on September 16 and the September 18 statement by the UNSC occurred during a lull in the imposition of barriers. And, the confirmation at a Texas hospital that a Liberian man indeed had Ebola occurred on September 30 with the first local transmission of the disease to one of his nurses on October 11, after most states that would eventually impose barriers had already done so.

Figure 1. Mapping the Ebola outbreak



However, there looks to be a second wave of states imposing barriers during the week of October 12, over two months after WHO’s declaration. This second wave still does not seem to track with outbreak severity. It does begin right after local transmission in the US and seems to correspond with an uptick in media coverage of the outbreak as well. This second wave suggests that, even if WHO’s declaration is one event that leads states to impose barriers, not surprisingly, it may not be the *only* event that could prompt this behavior. For example, other events like local transmission in the US, the introduction of screening for Ebola at US airports (which also began October 11), and increased media coverage of these events could heighten threat perception among certain countries and lead more states to impose barriers. However, Figure 1 suggests that the PHEIC declaration may be one of the events provoking barriers. Further, whatever the initial impetus, the IHR are clearly not playing the desired role of discouraging states from imposing barriers.

This descriptive data provides initial support to the argument that WHO’s declaration prompted some states to impose barriers. Of course, this figure alone cannot tell us that the likelihood of imposing barriers was not related to the severity of the outbreak or to the extent of media coverage. And, the figure alone cannot show that heightened fear of disease spread among high-income states did not influence both WHO’s declaration *and* the imposition of barriers that followed. As such, the next two subsections provide additional evidence.

*More States Imposed Barriers in the Weeks Following the Declaration, Even Controlling for Outbreak Severity and Media Attention*

Table 2 displays the results of six negative binomial models where the dependent variable is the number of states that begin imposing barriers each day of the outbreak. Model 1 examines whether more states imposed barriers in the first week after WHO’s declaration than at other times; Model 2 examines whether more states imposed barriers in the second week after WHO’s declaration; and, Model 3 examines whether more states imposed barriers in the first two weeks after WHO’s declaration. All three models control for the

number of Ebola fatalities. Models 4-6 include the number of Ebola cases in place of fatalities.<sup>59</sup>

Together, Models 1-6 show that the two weeks after WHO's declaration are associated with a higher number of countries imposing barriers than other times during the outbreak, either before or after the declaration. Holding the number of Ebola cases constant, the two weeks after the declaration are associated with 1.29 more countries imposing barriers per day than other times during the outbreak (based on Model 6,  $p < .05$ ). Importantly, neither the number of Ebola cases, nor the number of fatalities is significantly associated with the number of countries imposing barriers each day (it is worth noting that there is also no bivariate relationship between either the number of cases or fatalities and the number of states imposing barriers each day).

Table 2. Negative binomial models explaining the number of states imposing excessive measures each day of the outbreak (March 23, 2014-January 21, 2015)

	(1)	(2)	(3)	(4)	(5)	(6)
Deaths	0.001 (0.01)	0.002 (0.01)	0.01 (0.01)			
Cases				-0.002 (0.003)	-0.002 (0.003)	0.001 (0.003)
Week One	2.01** (0.69)			1.88** (0.69)		
Week Two		2.29*** (0.61)			2.19*** (0.60)	
Week One or Two			2.59*** (0.41)			2.44*** (0.40)
Observations	235	235	235	235	235	235

Note: ·  $p < 0.1$ ; \* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$   
Standard errors in parentheses

What about the role of media coverage? Models 7-12 in Table 3 are the models from Table 2, this time controlling for media coverage (and employing a Poisson model). Not surprisingly, more media coverage is significantly associated with the number of barriers imposed each day. However, even controlling for media coverage, the two weeks after WHO's declaration are associated with a higher number of countries imposing barriers than other times. Outbreak severity is still not positively associated with barriers. It is worth noting that controlling for media coverage actually poses a hard test for the argument presented here. Media coverage could be operating through several different channels. Possibilities include increasing fear among populations that then pressure governments to act, or directly heightening fear among policymakers. Alternatively, the extent of media coverage could be a reflection of some other process. One likely possibility is that media coverage is a mechanism through which the PHEIC declaration influences the number of countries imposing barriers. Thus, that the two weeks following the PHEIC are still

significantly associated with the number of countries imposing barriers per day, independent of media coverage, provides compelling evidence that the PHEIC may have been a trigger.

Table 3. Poisson models explaining the number of states imposing excessive measures each day of the outbreak (March 23, 2014-January 21, 2015), controlling for media coverage.

	(7)	(8)	(9)	(10)	(11)	(12)
Deaths	-0.01 (0.01)	-0.01 (0.01)	0.01 (0.01)			
Cases				-0.005 (0.004)	-0.004 (0.004)	0.0002 (0.004)
Week One	0.88* (0.44)			0.83 (0.43)		
Week Two		1.51*** (0.39)			1.46*** (0.39)	
Week One or Two			1.72*** (0.40)			1.59*** (0.37)
Media Coverage	0.12*** (0.02)	0.12*** (0.02)	0.11*** (0.02)	0.12*** (0.01)	0.12*** (0.02)	0.12*** (0.02)
Observations	235	235	235	235	235	235
<i>Note:</i>	· p<0.1; *p<0.05; **p<0.01; ***p<0.001 Standard errors in parentheses					

These results illustrate that the time period immediately following WHO's declaration is significantly associated with a higher number of countries imposing barriers, even controlling for outbreak severity and media coverage. However, we might still wonder whether some other country-specific factors explain whether states imposed barriers during this two-week period. In particular, if high-income countries are more likely to impose barriers during the two weeks following WHO's declaration, then the relationship we see between the declaration and the number of barriers may be spurious and could instead be driven by increased fear of disease spread among high-income countries. This increased fear may be unrelated to the PHEIC declaration, or, as suggested above, could have played a role in WHO declaring a PHEIC to begin with.

#### *Country Characteristics Played a Limited Role*

Table 4 presents the results from two logit models, where the dependent variable is whether each state imposed barriers during the two weeks after WHO's declaration. Model 13 includes all 194 states in the analysis. Model 14 includes just states that ended up imposing barriers. Both models show that domestic factors are not associated with whether states imposed barriers in the two weeks after the WHO declaration. Perhaps most importantly, higher income is not associated with behavior. This null finding casts doubt on the possibility that strong states became worried about disease spread at the beginning of August and that this explains both WHO's declaration *and* subsequent state imposition of

barriers. Even if high-income member states influenced the timing of WHO's declaration, this did not lead those same countries to impose excessive measures. These results add support to the contention that WHO's declaration sparked the imposition of barriers by some states. The only factor significantly associated with imposing barriers in the first two weeks is whether a state is located in the UN Africa region. Further exploration is needed into *why* countries within Africa were more likely than those in other regions to impose barriers. The point here is that the PHEIC declaration may have convinced those states in Africa considering a travel ban to go ahead and impose one.

Table 4. Logit models explaining whether states imposed excessive measures in the two weeks following WHO's declaration

	(13)	(14)
ln(GDP per capita)	0.21 (0.32)	-0.76 (0.50)
ln(GDP)	0.003 (0.22)	0.62 (0.47)
Democracy	0.10 (0.07)	0.06 (0.13)
Health Spending (% GDP)	-0.07 (0.14)	0.29 (0.34)
Africa Region	4.24*** (1.09)	5.45** (2.04)
H1N1 Barriers	1.34 (0.87)	2.71 (1.79)
Observations	151	34
<i>Note:</i>	· p<0.1; *p<0.05; **p<0.01; ***p<0.001 Standard errors in parentheses	

## DISCUSSION

The empirical analysis provides support for the argument presented here—that WHO's declaration of a PHEIC can provoke the imposition of excessive barriers. However, there are likely multiple events that could similarly “trigger” barriers, as well as several potential mechanisms through which the PHEIC declaration could be influencing state behavior. I address both of these points in what follows.<sup>60</sup>

First, WHO's declaration of a PHEIC is likely not the *only* event that could lead states to start imposing barriers. Before WHO gained the PHEIC declaration power in 2005, states imposed barriers in response to outbreaks—that behavior was one reason for the 2005 revision. During the 2014 Ebola outbreak, factors other than the PHEIC declaration led Bahrain and Gambia to impose excessive measures since both did so before the declaration was made. Further, as suggested above, the second wave of states imposing barriers beginning the week of October 12 (see Figure 1) may have been a reaction to the first case of local transmission in the US and the introduction of increased screening at US airports.

Nonetheless, the analysis presented in the previous section suggests that in the case of the 2014 Ebola outbreak, the PHEIC declaration played a major role in motivating many states to start imposing barriers around August 9. To further demonstrate the unique nature of the two weeks following the PHEIC declaration, as a robustness check I examine whether any of the other 43 weeks of the outbreak period are significantly associated with the number of states imposing barriers. Only one other week was associated with an increase in the number of states imposing barriers—not surprisingly, it was the week of October 12 just mentioned above. The evidence suggests that the PHEIC declaration provoked barriers during the Ebola outbreak, even though it may not be the *only* event that could do so.

The second point worth noting here is that this analysis does not isolate the precise mechanism driving the relationship between the PHEIC declaration and states' imposition of barriers. There are several possibilities. Is the declaration influencing state behavior through its effect on media coverage of the outbreak, which in turn heightens levels of fear among populations or policymakers? And, is fear increasing among governments, populations, or both? Further, is the declaration operating through its influence on governments' domestic political calculations or through international pressures?

The focus of this article is not on *which* states end up imposing barriers. Existing research on the H1N1 outbreak shows that governments that anticipate harmful domestic political backlash for not “doing something” in the face of an outbreak were more likely than others to impose barriers, suggesting that the PHEIC declaration may be operating through domestic channels.<sup>61</sup> However, it could also be that the PHEIC declaration led a few “first mover” states to impose barriers and then through a process of policy diffusion led other peer states to impose barriers as well. There is limited evidence of this in the case of the H1N1 outbreak, but there is some evidence of regional effects in the case of Ebola.<sup>62</sup> The argument in this article is that the PHEIC declaration can help to explain *when* many states will begin imposing barriers—this point is compatible with several potential explanations for *which* states those will be.

Perhaps the most important potential alternative explanation to the one presented here is that other co-occurring events with the August 8 PHEIC declaration might have led so many states to impose barriers around that time. I have tried to account for some of the most significant of these possibilities—outbreak severity and media coverage—by controlling for them in the analysis. I also address the possibility that powerful states both led WHO to make the declaration when it did and also then were the ones to impose barriers soon afterwards by showing that high income-countries were not more likely than others to impose barriers in the two weeks following the PHEIC declaration. Future work should enrich the analysis presented here by focusing on in-depth qualitative research into government decision-making during this period to hone in on the particular mechanisms at work.

## CONCLUSION AND OPTIONS FOR REFORM

States' imposition of overly restrictive trade and travel barriers is a longstanding issue dating back to the International Sanitary Conventions of the 1800s and most recently put on display during the 2014 Ebola outbreak. The three part analysis presented in this article provides compelling evidence that WHO's declaration of a PHEIC can provoke trade and travel barriers. Drawing on theories of institutional design, I argue that this is because the IHR have not sufficiently raised the costs of imposing excessive measures to address the cooperation problem driving the behavior of some states. These costs remain low due to both states' unwillingness to design more effective IHR when it comes to excessive measures and WHO's own reluctance to exercise the naming and shaming power it does have (though, as noted, there are some very good reasons for this from WHO's perspective). As a result, WHO's authority to declare a PHEIC enables it to send a very clear signal that a serious

outbreak is underway while the costs states face for imposing measures that are more restrictive than WHO recommends remain low. As a result, WHO's expanded role under the revised IHR to notify states when a global health emergency is underway serves as a signal to some states to overreact.

Analysis of data from the 2014 Ebola outbreak supports this argument. Only two states imposed barriers before WHO's declaration. Further, more states imposed barriers during the first two weeks after the declaration than at any other time, even controlling for media coverage and outbreak severity. Importantly, outbreak severity is not significantly associated with the number of countries imposing barriers. Further, whether countries imposed barriers in the first two weeks was not driven by country-level characteristics that might have also caused WHO to make the declaration. The Ebola case suggests that a PHEIC declaration could have a similar effect during future outbreaks. If WHO is to successfully coordinate the international response to global health emergencies, it must be able to notify states about these events to spark an effective response while preventing overreaction; the findings presented here suggest that the IHR have not yet addressed this challenge.

In spite of this unintended relationship between declaring a PHEIC and barriers, it is worth noting that the IHR may have positively influenced the behavior of some states. As described above, the revised IHR are designed provide faster and better information to states about a wider range of health threats. States are now better informed than they used to be about when a serious outbreak with potential for cross-border spread is occurring and how they should respond. While there are likely a variety of reasons why some states follow WHO recommendations, this improved information might have convinced some states that they should not impose barriers because they realize doing so is self-defeating from the perspective of outbreak preparedness and response. Though over 40 countries imposed excessive barriers during both H1N1 and Ebola, this represents a minority of states; most states followed WHO guidelines.

So, WHO's declaration only provoked *some* countries to impose barriers. And, the argument presented above suggests that many states are imposing barriers for a particular reason—because they have time-inconsistent preferences driven by domestic or international pressures. Some states will continue to disregard WHO recommendations as long as the benefits of imposing overly restrictive trade and travel barriers outweigh the costs of doing so. As such, this cost-benefit analysis must be shifted in favor of following WHO recommendations.

As we look ahead to the election of the next director-general of WHO, what are the options for more effectively addressing the cooperation problem? In the wake of H1N1 and Ebola, many recommendations have been made for reforming WHO's role in outbreak response and several focus on the issue of excessive measures.<sup>63</sup> These include further empowering the WHO Secretariat to “request justification of these measures under the Regulations,” “examine options for sanctions for inappropriate and unjustified actions under the Regulations,”<sup>64</sup> and calling on WHO to “confront governments that implement trade and travel restrictions without scientific justification.”<sup>65</sup> Another suggestion is to “consider the possibility of an intermediate level [declaration] that would alert and engage the wider international community at an earlier stage” before a PHEIC is underway.<sup>66</sup>

As others have pointed out, implementation of most of the recommendations made in the aftermath of Ebola is unlikely.<sup>67</sup> As noted above, during negotiations over revising the IHR, states were not willing to give “more teeth” to the commitment to follow WHO recommendations during outbreaks; there is little evidence that this has changed. And, WHO is not likely to start naming and shaming states without a change in the structural conditions that make the organization wary of criticizing its member states. In light of the findings presented here, the suggestion of an “intermediate” level alert that would signal an outbreak less serious than a PHEIC is not likely to stop states from overreacting. Any sort of declaration coming from WHO about a potentially serious outbreak may provoke some

states to impose barriers. And, even if this intermediate announcement did not provoke as many states to impose barriers as a PHEIC declaration, any time a PHEIC was declared—which, again, is when a coordinated international response is most needed—states would be likely to impose barriers in response.

Any reform that does not raise the costs of imposing excessive measures relative to the benefits is not likely to change state behavior on this count. And, these costs are likely to remain low as long as states are not invested in raising them. However, there are two ways that WHO itself might be able to shift this cost benefit analysis.

Raising the costs of imposing barriers is not the only way to shift states' cost benefit analysis. The other strategy would be to reduce the benefits of imposing barriers. A central benefit to governments is that barriers can provide them with political cover. If the outbreak ends up crossing the border and causing damage, the government is at least able to point to having tried to stop outbreak spread by imposing trade or travel barriers. But, this is only politically beneficial to governments if they think that the public believes that barriers protect from spread. As such, WHO could work to better communicate to populations during outbreaks, and at other times, that trade and travel barriers are not actually effective at stopping disease spread. Research shows that the public updates its perceptions about disease when exposed to new information; perhaps this applies to perceptions about which measures should be used to try to stop disease spread as well.<sup>68</sup>

Given that most other proposals are unlikely to be implemented in the near future, promoting learning, though it is not a quick fix, could be particularly promising in the case of the IHR because it actually builds on WHO's role as an information provider. WHO already has the authority to provide information about what constitutes an effective response to a given outbreak. It needs to do a better job of showing populations, not just governments and leaders, that trade and travel barriers are not effective at stopping spread.

More consequential, however, would be the election of a director-general willing to hold states accountable. As many have pointed out, if WHO would only exercise its power to name and shame, the costs of imposing excessive barriers would increase. This is a tall (and unlikely) order, but the election of a director-general with political experience and pre-existing relationships with member state governments—which is what set Dr. Gro Harlem Brundtland apart and may have allowed her to criticize states at times—might make this possible. However, Dr. Brundtland is an exception among WHO directors-general and there are reasons why member states tend not to elect those that might be more willing to call them out for bad behavior.<sup>69</sup> However, whoever fills the director-general role next has the potential to shape the future of the IHR and WHO's role in outbreak response.<sup>70</sup> If the costs of imposing excessive measures do not increase relative to the benefits, then WHO's power to declare a PHEIC will continue to provoke barriers and actually undermine outbreak response.

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- <sup>1</sup> David Fidler and Lawrence O. Gostin, "The New International Health Regulations: An Historic Development for International Law and Public Health," *The Journal of Law, Medicine & Ethics* 34, no. 1 (2006): 85.
- <sup>2</sup> World Health Organization, "International Health Regulations (1969)." (Geneva, Switzerland: World Health Organization, 1969), 5.
- <sup>3</sup> World Health Organization, "The Fourteenth Report of the Committee on International Quarantine, Volume I: Functioning of the International Sanitary Regulations for the Period 1 July 1964-30 June 1967."
- <sup>4</sup> Richard A. Cash and Vasant Narasimhan, "Impediments to Global Surveillance of Infectious Diseases: Consequences of Open Reporting in a Global Economy," *Bulletin of the World Health Organization* 78, no. 11 (2000): 1358–1367.
- <sup>5</sup> Adam Kamradt-Scott, "WHO's to Blame? The World Health Organization and the 2014 Ebola Outbreak in West Africa," *Third World Quarterly* 37, no. 3 (March 3, 2016): 411, doi:10.1080/01436597.2015.1112232.
- <sup>6</sup> Cash and Narasimhan, "Impediments to Global Surveillance of Infectious Diseases"; World Health Organization, "UN Senior Leaders Outline Needs for Global Ebola Response," *WHO*, September 3, 2014, <http://www.who.int/mediacentre/news/releases/2014/ebola-response-needs/en/>; World Bank, "Ebola: Most African Countries Avoid Major Economic Loss but Impact on Guinea, Liberia, Sierra Leone Remains Crippling," 2015, <http://www.worldbank.org/en/news/press-release/2015/01/20/ebola-most-african-countries-avoid-major-economic-loss-but-impact-on-guinea-liberia-sierra-leone-remains-crippling>.
- <sup>7</sup> For empirical evidence of this commitment problem, see Catherine Z. Worsnop, "Concealing Disease: The Threat of Trade and Travel Barriers and the Timeliness of Outbreak Reporting," Working Paper, (2016).
- <sup>8</sup> Peter Sands et al., "Assessment of Economic Vulnerability to Infectious Disease Crises," *The Lancet* 388, no. 10058 (November 12, 2016): 2443–48, doi:10.1016/S0140-6736(16)30594-3.
- <sup>9</sup> Catherine Z. Worsnop, "Domestic Politics and the WHO's International Health Regulations: Explaining the Use of Trade and Travel Barriers during Disease Outbreaks," *The Review of International Organizations*, November 26, 2016, 1–31, doi:10.1007/s11558-016-9260-1; See also Adam Kamradt-Scott and Simon Rushton, "The Revised International Health Regulations: Socialization, Compliance and Changing Norms of Global Health Security," *Global Change, Peace & Security* 24, no. 1 (2012): 57–70.
- <sup>10</sup> Worsnop, "Domestic Politics and the WHO's International Health Regulations."
- <sup>11</sup> Mark J. Siedner and John Kraemer, "The Global Response to the Ebola Fever Epidemic: What Took So Long?," *Speaking of Medicine*, August 22, 2014, <http://blogs.plos.org/speakingofmedicine/2014/08/22/global-response-ebola-fever-epidemic-took-long/>.
- <sup>12</sup> World Health Organization, "Report of the Ebola Interim Assessment Panel," 2015, <http://www.who.int/csr/resources/publications/ebola/report-by-panel.pdf>.
- <sup>13</sup> Alexandra M. Stern and Howard Markel, "International Efforts to Control Infectious Diseases, 1851 to the Present," *JAMA* 292, no. 12 (September 22, 2004): 1474–79.
- <sup>14</sup> World Health Organization, *The First Ten Years of the World Health Organization* (Geneva, Switzerland: World Health Organization, 1958).
- <sup>15</sup> Michael Worboys, *Spreading Germs: Disease Theories and Medical Practice in Britain, 1865-1900* (Cambridge, U.K.: Cambridge University Press, 2000), 39; Francesco Carelli, "Miasmatists and Health Reforms," *London Journal of Primary Care* 4, no. 2 (2012): 148–49.
- <sup>16</sup> World Health Organization, *The First Ten Years of the World Health Organization*; see also Richard Cooper, "International Cooperation in Public Health as a Prologue to Macroeconomic Cooperation," in *Can Nations Agree?: Issues in International Economic Cooperation* (Washington, DC: Brookings Institution Press, 1989).
- <sup>17</sup> World Health Organization, *International Sanitary Regulations* (Geneva, Switzerland, 1951).
- <sup>18</sup> *Ibid.*, Article 23.
- <sup>19</sup> This provision was only ever used one time when Turkey charged Bulgaria and Romania with unnecessarily restricting Turkish goods during a cholera outbreak in 1970. Turkey referred the case to the director-general, and it was resolved by the Committee on International Surveillance of Communicable Diseases (formally the Committee on International Quarantine). See, World Health Organization, "The Sixteenth Report of the Committee on International Surveillance of

- Communicable Diseases," 1971, 30, WHO /IQ/70.152. Though the provision was only formally used once, WHO was often informally involved in settling disputes. See, World Health Organization, "Official Records of the World Health Organization, No. 9: Report of the Interim Commission to the First World Health Assembly, Part 1: Activities" (Geneva, Switzerland, 1948), 36.
- <sup>20</sup> World Health Organization, "The Fourteenth Report of the Committee on International Quarantine, Volume II: Special Review of the International Sanitary Regulations," 1967, 6, WHO/IQ/67.147; World Health Organization, "Official Records of the World Health Organization, No. 172: The Work of WHO 1968" (Geneva, Switzerland, 1969), 9.
- <sup>21</sup> Barbara von Tigerstrom, "The Revised International Health Regulations and Restraint of National Health Measures," *Health Law Journal* 13 (2005): 35.
- <sup>22</sup> See, for example, Fidler and Gostin, "The New International Health Regulations."
- <sup>23</sup> Thomas C. Schelling, *The Strategy of Conflict* (Cambridge, MA: Harvard University Press, 1960); Kenneth W. Abbott and Duncan Snidal, "Hard and Soft Law in International Governance," *International Organization* 54, no. 3 (2000): 421–456.
- <sup>24</sup> Abbott and Snidal, "Hard and Soft Law in International Governance," 429.
- <sup>25</sup> Worsnop, "Domestic Politics and the WHO's International Health Regulations."
- <sup>26</sup> Kenneth W. Abbott and Duncan Snidal, "Why States Act Through Formal International Organizations," *Journal of Conflict Resolution* 42, no. 1 (1998): 3–32; Kenneth W. Abbott and Duncan Snidal, "Hard and Soft Law in International Governance," *International Organization* 54, no. 3 (2000): 421–456.
- <sup>27</sup> Legalization has three components: delegation, precision, and obligation. The degree of delegation is the extent to which neutral third parties (either the institution itself or other actors) have been granted authority to create, interpret, implement, and/or enforce rules. Precision refers to whether institutional rules clearly and unambiguously lay out what is expected of states (or other actors) in a given circumstance, so narrowing "the scope for reasonable interpretation." Obligation refers to the extent to which states are bound by commitments to institutional rules. See Kenneth W. Abbott et al., "The Concept of Legalization," *International Organization* 54, no. 3 (2000): 412; See also Judith L. Goldstein and Lisa L. Martin, "Legalization, Trade Liberalization, and Domestic Politics: A Cautionary Note," *International Organization* 54, no. 3 (2000): 603.
- <sup>28</sup> Robert Keohane, *After Hegemony: Cooperation and Discord in the World Political Economy* (Princeton: Princeton University Press, 1984); Beth A. Simmons and Zachary Elkins, "The Globalization of Liberalization: Policy Diffusion in the International Political Economy," *American Political Science Review* 98 (2004): 171–190.
- <sup>29</sup> Judith Kelley, "Who Keeps International Commitments and Why? The International Criminal Court and Bilateral Nonsurrender Agreements," *American Political Science Review* 101, no. 3 (2007): 573–589; Xinyuan Dai, "The Conditional Nature of Democratic Compliance," *Journal of Conflict Resolution* 50, no. 5 (2006): 690–713; Xinyuan Dai, "Why Comply? The Domestic Constituency Mechanism," *International Organization* 59, no. 2 (2005): 363–398.
- <sup>30</sup> Abbott and Snidal, "Hard and Soft Law in International Governance," 434; See also, Jana Von Stein, "Do Treaties Constrain or Screen? Selection Bias and Treaty Compliance," *American Political Science Review* 99, no. 4 (2005): 611–22.
- <sup>31</sup> Worsnop, "Domestic Politics and the WHO's International Health Regulations"; Kamradt-Scott, "WHO's to Blame?," 411.
- <sup>32</sup> Kamradt-Scott, "WHO's to Blame?"
- <sup>33</sup> See, for example, US Department of State, "Demarche Request: Urge Posts to Remove Trade Bans on Pork due to H1N1 Fears" (WikiLeaks. WikiLeaks cable: 09STATE44254\_a, April 30, 2009), [https://search.wikileaks.org/plusd/cables/09STATE44254\\_a.html](https://search.wikileaks.org/plusd/cables/09STATE44254_a.html).
- <sup>34</sup> Abbott and Snidal, "Hard and Soft Law in International Governance," 429.
- <sup>35</sup> Catherine Z. Worsnop, "The Politics of Outbreak Response: The Causes and Consequences of Revising the WHO's International Health Regulations" (Ph.D. dissertation, Brandeis University, 2016).
- <sup>36</sup> Sara E. Davies, Adam Kamradt-Scott, and Simon Rushton, *Disease Diplomacy: International Norms and Global Health* (Baltimore: Johns Hopkins University Press, 2015); Adam Kamradt-Scott, *Managing Global Health Security: The World Health Organization and Disease Outbreak Control* (New York: Palgrave Macmillan, 2015).
- <sup>37</sup> In contrast, this would be harder to do with the case of the 2009 H1N1 pandemic since WHO declared that outbreak a PHEIC very soon after the first cases were reported.

<sup>38</sup>A full discussion of data and methods, including descriptive statistics and robustness checks, is in the appendix, which is available upon request from the author.

<sup>39</sup>Case and fatality data from HealthMap, “2014 Ebola Outbreaks,” 2016, <https://www.healthmap.org/ebola/>; to capture the level of media coverage on the outbreak, I include the number of articles with headlines including the term “Ebola” published in major world publications (newspapers, magazines, and trade publications) according to LexisNexis Academic. The number of articles is not a perfect measure of media attention. We might, for example, also be interested in the substance of media coverage. However, the substance of media coverage likely varies across countries. Because the analysis is looking at the total number of countries that impose barriers each day, rather than variation across countries, the media coverage variable needs to be a system level variable that is constant across countries. The number of articles gets at the overall level of media attention. Variation in the substance of media coverage across countries could certainly be important to look at in further research on which countries end up imposing barriers. Others have used publications as a measure of media attention and their work also highlights that substance likely varies across countries. See, Tara Kirk Sell et al., “Media Messages and Perception of Risk for Ebola Virus Infection, United States,” *Emerging Infectious Diseases* 23, no. 1 (2017): 108; Corey H Basch, Charles E Basch, and Irwin Redlener, “Coverage of the Ebola Virus Disease Epidemic in Three Widely Circulated United States Newspapers: Implications for Preparedness and Prevention,” *Health Promotion Perspectives* 4, no. 2 (December 30, 2014): 247–51, doi:10.5681/hpp.2014.032; Sam Smith and Stella Smith, “Media Coverage of the Ebola Virus Disease in Four Widely Circulated Nigerian Newspapers: Lessons from Nigeria,” *Health Promotion Perspectives* 6, no. 2 (June 11, 2016): 92–95, doi:10.15171/hpp.2016.16.

<sup>40</sup>WHO has stated that 47 states imposed excessive barriers during Ebola. See, World Health Organization, “2014 Ebola Virus Disease Outbreak: Current Context and Challenges; Stopping the Epidemic; and Preparedness in Non-Affected Countries and Regions: Report by the Secretariat,” May 15, 2015, Document Number: A68/24. But, according to personal email correspondence with the Director of the Secretariat for the Review of the International Health Regulations (IHR), the organization is not planning to make that list public.

<sup>41</sup>World Health Organization, “Statement on the 1st Meeting of the IHR Emergency Committee on the 2014 Ebola Outbreak in West Africa,” August 8, 2014, <http://who.int/mediacentre/news/statements/2014/ebola-20140808/en/>.

<sup>42</sup>Other research counts over 50 states that imposed barriers. See, Wendy Rhymer and Rick Speare, “Countries’ Response to WHO’s Travel Recommendations during the 2013–2016 Ebola Outbreak,” *Bulletin of the World Health Organization* 95, no. 1 (January 1, 2017): 10–17, doi:10.2471/BLT.16.171579. Differences in coding are explained by a different observation period as well as the fact that I do not include cases of only mandatory quarantine.

<sup>43</sup>World Health Organization, “Statement on the 4th Meeting of the IHR Emergency Committee Regarding the 2014 Ebola Outbreak in West Africa,” *WHO*, January 21, 2015, <http://www.who.int/mediacentre/news/statements/2015/ebola-4th-ihc-meeting/en/>.

<sup>44</sup>I use the same observation period as above: the day WHO reported the first cases—March 23, 2014—and lasting 305 days through the day after the fourth meeting of the IHR Emergency Committee on Ebola—January 21, 2015. Findings are robust to different length observation periods.

<sup>45</sup>I use a negative binomial model where the data is overdispersed, and otherwise a Poisson model. See, Michael Smithson and Edgar C. Merkle, *Generalized Linear Models for Categorical and Continuous Limited Dependent Variables* (CRC Press, 2013); J. Scott Long, *Regression Models for Categorical and Limited Dependent Variables* (SAGE, 1997).

<sup>46</sup>These independent variables are not lagged in the analysis presented in the paper, but as a robustness check I lag cases, deaths, and media coverage by one day and the results are unchanged.

<sup>47</sup>This could have been done with a duration model, but logistic regression gets at what I am interested in more directly—variation in whether countries imposed barriers in the first two weeks—rather than which types of countries imposed barriers more quickly than others as in a duration model.

<sup>48</sup>To measure democracy, I use the Polity score from Monty G. Marshall, Keith Jaggers, and Ted Robert Gurr, *Polity IV Project: Political Regime Characteristics and Transitions, 1800–2012* (Center for Systemic Peace, 2014), <http://www.systemicpeace.org/inscr/p4manualv2012.pdf>; GDP, GDP per capita, and health spending data come from World Bank, “World Development Indicators,” 2016, <http://data.worldbank.org/data-catalog/world-development-indicator>.

<sup>49</sup> “Guinea: Mobilisation against an Unprecedented Ebola Epidemic,” *Médecins Sans Frontières (MSF) International*, accessed December 14, 2016, <http://www.msf.org/en/article/guinea-mobilisation-against-unprecedented-ebola-epidemic>.

<sup>50</sup> “How Many Ebola Patients Have Been Treated Outside of Africa?,” *The New York Times*, July 31, 2014, <http://www.nytimes.com/interactive/2014/07/31/world/africa/ebola-virus-outbreak-qa.html>.

<sup>51</sup> *Ibid.*

<sup>52</sup> White House Office of the Press Secretary, “Fact Sheet: U.S. Response to the Ebola Epidemic in West Africa,” *Whitehouse.gov*, September 16, 2014, <https://obamawhitehouse.archives.gov/the-press-office/2014/09/16/fact-sheet-us-response-ebola-epidemic-west-africa>.

<sup>53</sup> United Nations Security Council, “Resolution 2177 (2014),” accessed March 15, 2017, [https://www.un.org/en/ga/search/view\\_doc.asp?symbol=S/RES/2177%20\(2014\)](https://www.un.org/en/ga/search/view_doc.asp?symbol=S/RES/2177%20(2014)).

<sup>54</sup> “How Many Ebola Patients Have Been Treated Outside of Africa?”

<sup>55</sup> *Ibid.*

<sup>56</sup> US Department of State, “Security Message for U.S. Citizens: Banjul (Gambia), Entry Restrictions for The Gambia due to Ebola Virus Disease,” September 5, 2014, <https://www.osac.gov/pages/ContentReportDetails.aspx?cid=16271>.

<sup>57</sup> Siedner and Kraemer, “The Global Response to the Ebola Fever Epidemic”; See also Daniel G. Bausch and Lara Schwarz, “Outbreak of Ebola Virus Disease in Guinea: Where Ecology Meets Economy,” *PLOS Neglected Tropical Diseases* 8, no. 7 (July 31, 2014): e3056, doi:10.1371/journal.pntd.0003056.

<sup>58</sup> World Health Organization, “Statement on the 1st Meeting of the IHR Emergency Committee on the 2014 Ebola Outbreak in West Africa.”

<sup>59</sup> Note that I use listwise deletion for all regression analyses included in the main text, but as a robustness check I redo the analysis using multiple imputation to account for missingness. See Gary King et al., “Analyzing Incomplete Political Science Data: An Alternative Algorithm for Multiple Imputation,” *American Political Science Review* 95, no. 1 (2001): 49–70.

<sup>60</sup> The author thanks the editors and two anonymous reviewers for helping to clarify these points.

<sup>61</sup> Worsnop, “Domestic Politics and the WHO’s International Health Regulations.”

<sup>62</sup> See Table 4 and also Worsnop, “The Politics of Outbreak Response,” chap. 6.

<sup>63</sup> Suerie Moon et al., “Will Ebola Change the Game? Ten Essential Reforms before the next Pandemic. The Report of the Harvard-LSHTM Independent Panel on the Global Response to Ebola,” *The Lancet* 386, no. 10009 (November 2015): 2204–21; World Health Organization, “Report of the Ebola Interim Assessment Panel”; World Health Organization, “Implementation of the International Health Regulations (2005): Report of the Review Committee on the Functioning of the International Health Regulations (2005) in Relation to Pandemic (H1N1) 2009” (Geneva: World Health Organization, May 5, 2011), [http://apps.who.int/gb/ebwha/pdf\\_files/WHA64/A64\\_10-en.pdf?ua=1](http://apps.who.int/gb/ebwha/pdf_files/WHA64/A64_10-en.pdf?ua=1).

<sup>64</sup> World Health Organization, “Report of the Ebola Interim Assessment Panel,” 12.

<sup>65</sup> Moon et al., “Will Ebola Change the Game?,” 1.

<sup>66</sup> World Health Organization, “Report of the Ebola Interim Assessment Panel,” 6.

<sup>67</sup> Kamradt-Scott, “WHO’s to Blame?,” 411.

<sup>68</sup> Milan Brahmabhatt and Arindam Dutta, “On SARS Type Economic Effects during Infectious Disease Outbreaks,” Policy Research Working Paper (Washington, DC: World Bank, 2008), <https://openknowledge.worldbank.com/handle/10986/6440>.

<sup>69</sup> Yanzhong Huang and Gabriella Meltzer, “Who Have Been the Best WHO Director-Generals?,” *Council on Foreign Relations - The Internationalist*, November 25, 2016, <http://blogs.cfr.org/patrick/2016/11/25/who-have-been-the-best-who-director-generals/>.

<sup>70</sup> Others have pointed to how consequential Dr. Brundtland was for the IHR, see Adam Kamradt-Scott, “The WHO Secretariat, Norm Entrepreneurship and Global Disease Control,” *Journal of International Organization Studies* 1, no. 1 (2010): 72–89.

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