Disease and Dissent: Epidemics as a Catalyst for Social Unrest

Rebecca Cordell 🆔
University of Texas at Dallas, USA

Reed M. Wood 🆔
University of Essex, UK

and

Thorin M. Wright 🆔
Arizona State University, USA

We identify a set of potential theoretical mechanisms that link the outbreak and spread of communicable diseases to temporal and spatial patterns of social unrest. Despite the proliferation of research since 2020 analyzing the social impact of the Covid-19 pandemic, we examine the broader relationship between less severe epidemic outbreaks and their social consequences. Epidemics, as well as the policies that governments implement to tackle them, often generate acute grievances among the public and create new opportunities for collective dissent, the combination of which promotes unrest. Nonetheless, perceived opportunities for unrest are influenced by the scale and scope of the disease outbreak, and particularly lethal disease outbreaks may therefore offset the incentives for collective mobilization. We examine these relationships using sub-national data on communicable disease outbreaks and geo-located social unrest events data in 60 African and Latin American countries from 1990 to 2017 and find support for our argument. However, we observe a curvilinear relationships between the severity of the epidemic and the incidence of unrest.

Dans cet article, nous identifions un ensemble de mécanismes théoriques potentiels pour relier l'apparition et la propagation d'une épidémie à des schémas temporels et spatiaux de troubles sociaux. Depuis 2020, on assiste à une prolifération des travaux de recherche qui analysent les conséquences sociales de la pandémie de Covid-19. De notre côté, nous nous intéressons plus largement à la relation entre l'apparition d'épidémies moins graves et leurs conséquences sociales. Les épidémies, mais aussi les politiques mises en œuvre par les gouvernements pour y répondre, génèrent souvent de vives plaintes de la part du peuple, ainsi qu'une contestation collective. Une fois combinés, ces deux phénomènes favorisent les troubles sociaux. Néanmoins, la perception des possibilités de troubles est influencée par l'échelle et la portée des épidémies, notamment quand elles sont mortelles, et peut donc contrebalancer les motivations pour la mobilisation collective. Nous analysons ces relations à l'aide de données sous-nationales sur l'apparition d'épidémies et de données sur des troubles sociaux géolocalisés au sein de 60 pays africains et sud-américains entre 1990 et 2017. Nous trouvons ainsi des éléments pour étayer notre hypothèse. D'après les résultats, le lien entre épidémies et troubles sociaux serait particulièrement significatif. Cependant, nous observons une relation curvilinéaire entre la gravité d'une épidémie et l'occurrence des troubles.

En este artículo identificamos un conjunto de potenciales mecanismos teóricos que vinculan el brote y la propagación de enfermedades transmisibles con patrones temporales y espaciales de malestar social. A pesar de que, desde 2020, han proliferado las investigaciones que analizan el impacto social de la pandemia de COVID-19, estudiamos la relación, más amplia, existente entre los brotes epidémicos menos graves y sus consecuencias sociales. Las epidemias, así como las políticas que implementan los Gobiernos con el fin de enfrentarse a ellas, generan a menudo graves quejas entre la población y crean nuevas oportunidades para la aparición de disidencia colectiva, las cuales, combinadas, pueden generar cierto malestar social. No obstante, las oportunidades percibidas para la aparición de este malestar están influenciadas por la escala y el alcance del brote de la enfermedad y, por lo tanto, los brotes de enfermedades particularmente letales pueden contrarrestar los incentivos para la movilización colectiva. Encontramos apoyo para nuestro argumento mediante el estudio de estas relaciones. Para ello, utilizamos datos subnacionales relativos a brotes de enfermedades transmisibles, así como datos de disturbios sociales geolocalizados en 60 países africanos y latinoamericanos desde 1990 hasta 2017. De manera más específica, los resultados sugieren que las epidemias están significativamente asociadas con el malestar social. Sin embargo, observamos una relación curvilínea entre la gravedad de la epidemia y la incidencia del malestar social.

The global COVID-19 pandemic created complex, interrelated sets of public health and political challenges for many countries.[1] In response to the grave threats posed by the rapid spread of the novel coronavirus responsible for COVID-19, many countries imposed policies that placed significant restrictions on citizens' rights and privileges. While governments deemed these prescriptions necessary to protect public health, citizens sometimes challenged their im-

[1] *Epidemic* refers to a disease outbreak that spreads within communities and geographic areas at higher rates than expected. *Pandemics* are epidemics that have affected large numbers of people and spread across borders into multiple countries (see Porta 2014). As pandemics are a subset of epidemics, we rely primarily on the term epidemic throughout.

plementation and actively resisted authorities' efforts to enforce them. Indeed, policies intended to contain or mitigate the spread of COVID-19 prompted widespread (and sometimes violent) public backlash and social unrest in several countries. For example, efforts by French police to enforce lockdown policies provoked protests and violent clashes between officers and immigrant youths in the Paris outskirts (Bremner 2020). Migrant workers in India clashed with police during protests against the government's lockdown policies (Khanna 2020). And the reintroduction of restrictions intended to counter a second wave of COVID-19 infections prompted demonstration in several Italian cities, some of which resulted in violent altercations between police and protesters (Di Donato and Dewan 2020).

COVID-19-related unrest represents only the most recent example of dissent associated with outbreak of contagious diseases. In the nineteenth century, demonstrations, riots, and violent clashes with state authorities routinely occurred during cholera epidemics in Great Britain, the Russian Empire, and the United States (US) (Sahadeo 2005; Cohn 2018). Smallpox outbreaks in the US and Canada during the early twentieth century also occasionally sparked unrest, which lasted for weeks in some cities (Cohn 2018, 63–64). Social violence has also accompanied Ebola outbreaks in West and Central African countries in recent years (NPR 2014; BBC 2014a).

Contemporary media reports as well as historical accounts illustrate how unrest can develop and spread during large-scale disease outbreaks. Recent research has explored the role of COVID-19 on political unrest (Wood et al. 2022), repression (Barcelo et al. 2022), and armed conflict (Ide 2021; Koehnlein and Koren 2022). Yet, social scientists have thus far largely overlooked the ways that epidemics and pandemics beyond COVID might influence the likelihood of political upheaval and social conflict in the areas in which they occur. We therefore take this opportunity to conduct an initial investigation of this potential general relationship, and we identify a set of theoretical mechanisms that plausibly link disease epidemics and social unrest. In broad terms, we contend that large-scale communicable disease outbreaks create conditions that are conducive to an increase in social unrest and popular dissent. More specifically, we highlight how epidemics and pandemics contribute to or amplify several of the well-established correlates of protests, riots, and other forms of social unrest. Yet, we also highlight the potentially non-linear nature of these relationships. In particular, we contend that beyond a certain threshold of severity, rising disease prevalence can exert divergent influences on citizens' incentives for opposition (e.g., grievances) and their opportunities for engaging in it. Even where rising severity produces increasingly intense grievances, it may simultaneously constrain opportunities for mobilization. Thus, we contend that unrest increases in the wake of an epidemic, but the strength of this relationship weakens in the context of a particularly severe epidemic.

We evaluate the empirical validity of our argument by analyzing fine-grained, geo-referenced data on the occurrence of disease epidemics and social unrest (demonstrations and riots) in a sample of first-order administrative units in sixty African and Latin American countries between 1990 and 2017. In order to account for the possible non-random assignment of epidemics across sub-national units, we employ matching techniques that pair units that experienced epidemics with highly similar units that did not experience epidemics. Even after accounting for potential selection bias, results from a series of regression models suggest that the frequency of social unrest increases in areas that experience large-scale outbreaks of infectious disease. Furthermore, we also find evidence of a potential curvilinear relationship between epidemic severity and unrest, suggesting that unrest is likely when epidemics have low and moderate severity, but as epidemics become very severe, unrest becomes less likely.

Models of Public Discord and Dissent

Social unrest manifests in a variety of ways, ranging from organized acts of civil disobedience and non-violent demonstrations to violent, sometimes deadly intra-communal riots and insurrections. While different forms of unrest possess distinctive qualities, all types of collective dissent reflect situations in which groups of individuals coordinate (to some degree) their actions in order to express collective grievances and seek redress for those for grievances by attempting to impose costs on their perceived source (e.g., the government, other societal groups, etc.).[2]

Theories of social unrest often explain its onset and expansion by focusing on either the collective grievances that motivate dissent and violence (e.g., Gurr 1970) or structural and organizational changes within groups and polities that create new opportunities for mobilization (e.g., McAdam, Tarrow, and Tilly 2004). While these theoretical frameworks privilege different explanatory factors and identify different mechanisms responsible for dissent, they are rarely mutually exclusive. However, the ubiquitous nature of grievances implies that expanding opportunities are often required for the transformation of public dissatisfaction into popular mobilization (Oberschall 1978; Jenkins 1983). As such, the presence of political opportunities likely conditions the role of grievances in motivating collective dissent (Grasso and Giugni 2016). As we discuss in greater detail below, epidemics often produce grievances as well as create opportunities for mobilization, increasing the likelihood of social unrest in affected locales.

Grievance-oriented mobilization theories highlight material factors such as relative economic deprivation, income inequality, and worsening macroeconomic conditions. Despite ambiguous empirical support in earlier studies regarding the role of deprivation and structural inequality in driving protest and rebellion, several recent studies indicate that material grievances are important motivators of social unrest. For example, Mueller (2013) finds that contemporary protests in Africa are often driven by economic grievances. Similarly, Kawalerowicz and Biggs (2015) demonstrate that economic deprivation and material grievances were strongly associated with participation in the 2011 London Riots. Other studies likewise suggest that acute financial losses, unexpected labor market contractions, and rising inter-group competition over resources are associated with social unrest (Olzak and Shanahan 1996; della Porta 2008; Grasso and Giugni 2016), while economic growth appears to inhibit some forms of unrest (Bohlken and Sergenti 2010). A related body of research identifies food insecurity and food price volatility, which often generate grievances and exacerbate resource competition, as important catalysts for social unrest and violent conflict (e.g., Bellemare 2014; Hendrix and Haggard 2015). Patterns of civil unrest are also heavily influenced by how authorities respond to public grievances, dissident demands, and prior patterns of dissent (Wilkinson 2009). In particular, state repression is often viewed as a

---

[2]While riots are often viewed as spontaneous outbursts of irrational violence, participants often have rational motives, and their actions are purposeful and calculated (Mason 1984; Wilkinson 2009).

source of collective grievances that motivates dissent (Opp and Roehl 1990; Rasler 1996).

In contrast to grievance-based arguments, political opportunity arguments stress the central role of structural or organizational changes that raise or lower the costs of mobilization or influence the perceived odds of its success. Conceptualizations of political opportunity vary substantially and often include changes in activists' perception of threat, weakened state repressive capacity, diminished state bureaucratic capabilities, and declining government legitimacy (e.g., Brocket 1991; Boudreau 1996; Meyer 2004). The presence or proliferation of these factors encourages dissent among aggrieved members of the community, thus increasing the odds of unrest.

Insights from these broad theoretical traditions inform our argument regarding the expected relationship between epidemics and unrest. The brief review of the literature above highlights a set of intermediary factors that we argue link large-scale disease outbreaks and patterns of social unrest. More specifically, we contend that protests, riots, and other forms of unrest emerge as collective responses to the conditions epidemics create in affected communities and the policies governments adopt as they attempt to manage the disease outbreak. In this sense, we view the relationship between epidemics and unrest as similar to the links scholars now commonly draw between exogenous environmental factors such as climate change or natural disasters and sociopolitical conflict. For example, climate change itself has little direct influence on the location or timing of social conflict and dissent. Rather, the droughts, floods, or shorter growing seasons associated with climate change influence resource availability, food prices and supply, migration, and economic growth, which in turn influence the timing and locations of social conflict (e.g., Nördas and Gleditsch 2007; Raleigh 2010; Hendrix and Salehyan 2012; Jones, Mattiacci, and Braumoeller 2017). Similarly, natural disasters are linked to political violence, instability, dissent, and repression through largely indirect mechanisms. These include the adverse impact of disasters on resource scarcity, inequality and deprivation, pre-existing social cleavages, and state capacity (Drury and Olson 1998; Quiroz Flores and Smith 2013; Wood and Wright 2016).

As with climate change and natural disasters, epidemics are not the proximate cause of unrest. Instead, large-scale outbreaks of infectious disease often create conditions that are conducive to collective dissent, unrest, and popular resistance to authority. Epidemics induce fear and heighten uncertainty, diminish state capacity, generate acute economic losses, create resource shortages and competition, undermine leaders' legitimacy, and intensify existing iniquities in societies. These factors in turn create opportunities and incentives for members of the public to mobilize—sometimes violently—against the government or against other social groups that participants hold responsible for collective grievances.

Linking Epidemics and Social Unrest

Large-scale disease outbreaks often provoke intense emotional responses among the population in the areas they most acutely affect. Such feelings are particularly common when a pathogen is novel or manifests itself in unexpected ways that undermine the effectiveness of the tools and methods authorities commonly employ to control them (Strong 1990). Fear and anxiety are powerful influencers of political participation and can increase citizens' engagement in the political process, but these emotions also create opportunities for manipulation, scapegoating, and social discord (Albertson and Gadarian 2015). During crises, citizens look to trusted institutions and leaders to provide guidance, certainty, and safety.

Inadequate or inequitable government responses to public health crises can undermine citizens' trust in government and intensify popular grievances (e.g., Blair, Morse, and Tsai 2017), thus incentivizing challenges to authority and encouraging violence against vulnerable groups. As with natural disasters, how promptly and how effectively a state responds to an epidemic can serve as a focal point for public evaluations of state capacity and attitudes toward the incumbent government (see Dionne 2011; Wood and Wright 2016). If authorities fail to contain the spread of the disease or deaths remain high for extended period of times, then citizens are likely to perceive the government as incompetent or ineffectual. State authorities may therefore become targets of public animosity. As popular grievances increase and faith in government weakens, groups of individuals may spontaneously engage in rioting to express anger and frustration with authorities or may participate in more organized protests intended to draw attention to their concerns and increase pressure on the government to mount a more satisfactory public health response. For instance, Brazilian President Bolsonaro's poor handling of the COVID-19 crisis sparked protests as cases rapidly escalated (Nuyen 2020). The expansion of HIV/AIDS activism through the 1980s and 1990s likewise arose in reaction to tepid responses to the crisis from US health officials and politicians (Piot 2015; Snowden 2020).

While belated or ineffective government responses to epidemics can generate dissatisfaction and mistrust, heavy-handed mitigation strategies that restrict citizens' freedoms and disrupt their daily lives are likely to produce backlash and unrest, even when they are adopted to protect public health and save lives. For example, following the advice of public health professionals and scientists, governments around the world imposed significant restrictions on citizens' freedoms of movement and association during the COVID-19 pandemic in attempt to reduce infections and minimize the public health burden of the pandemic. Yet, in many instances, the curfews, travel prohibitions, school closures, and restrictions on commerce that political authorities imposed on their citizens produced opposition, resistance, and social unrest (e.g., Beckett 2020; Walker 2020). Recent systematic analyses of these relationships confirm the positive association between the severity of COVID-19 restrictions and levels of social unrest (Plümper, Neumeyer, and Pfaff 2021; Wood et al. 2022). Owing to the grievances they induce, such policies often require police or military enforcement, which can create further tensions between the population and authorities. Quarantine rules have often provoked public resistance, riots, and violent clashes with authorities (Evans 1988; Hays 2005). For example, Ebola-related quarantine efforts produced social unrest and violence in Liberia's capital in 2014 (BBC 2014b; McNeil 2014). More recently, residents of one German community rioted in response to police efforts to enforce a quarantine order during the COVID-19 pandemic (BBC 2020). As these examples demonstrate, government restrictions adopted to protect public can produce resentment and instigate unrest.

Overzealous enforcement of mitigation policies by security forces can also incite unrest. Indeed, the reciprocal relationship between state repression and dissent is well established (Carey 2006). For example, hundreds of Kenyans demonstrated against the use of lethal violence by police

to enforce COVID-19-related curfews (Sperber 2020). While constraints on civil liberties and pre-emptive repression can successfully deter popular mobilization (Ritter and Conrad 2016), state violence often serves as a catalyst for violent and non-violent behavioral challenges to the state, particularly where the public perceives the coercive response as illegitimate or excessive (Opp and Roehl 1990; Rasler 1996). Thus, even where the population broadly supports government efforts to control the epidemic, violence and repression targeted at individuals and groups that disobey newly imposed regulations may prompt backlash, including demonstrations or riots.

Epidemics have a deleterious effect on macroeconomic conditions and can produce acute resource shortages, both of which are linked to public discord and unrest. The 2014 West African Ebola outbreaks are estimated to have resulted in up to $32 billion in lost GDP among affected countries (Huber, Finelli, and Stevens 2018). Moreover, in Liberia, the Ebola outbreak was associated with an appreciable decline in household income (Gatiso et al. 2018). Similarly, the costs associated with the 1991 Peruvian cholera epidemic have been estimated at nearly $150 million ($\sim$$266 million in 2020 dollars) (Suarez and Bradford 1993). While the total economic impact of the COVID-19 pandemic is still unknown, the Organization for Economic Co-operation and Development estimates that many of the world's largest economies will suffer a net fall in GDP of between 6 and 11 percent, resulting in job losses comparable to those observed during the Great Depression (Inman 2020; Mutikani 2020). Consequently, to the extent that epidemics weaken economies, reduce wages, and increase unemployment, they may also create incentives for popular mobilization or violence.

In a similar manner, disease outbreaks can also create acute resource scarcities, which can exacerbate existing inequalities or underlying social tensions, fuel grievances, and promote challenges to the state. In particular, epidemics (as well as government responses to them) can produce or worsen food insecurity. Epidemic-induced food insecurity occurs when illness among workers produces labor shortages or when mobility restrictions (e.g., travel bans and community quarantines) adversely impact food production and distribution. For instance, quarantine measures introduced to contain the spread of Ebola in Sierra Leone prevented agricultural workers from harvesting crops, which in turn disrupted supply chains and threatened the country's food supply (Kodish et al. 2019). Similarly, Ebola outbreaks reduced crop yields among Liberian farm households and exacerbated food insecurity in some parts of the country (Gatiso et al. 2018). For these reasons, health officials and policymakers have recently expressed concerns about the strain the COVID-19 pandemic has placed on global food supply chains, particularly in the developing world (Gunia 2020; Harvey 2020). Given the established association between food insecurity and unrest (e.g., Bellemare 2014), the risk of social unrest increases where epidemics threaten the food supply, disrupt supply chains, or contribute to the rapid escalation of food prices. Historical and contemporary examples likewise illustrate this relationship. Quarantine measures imposed on French cities during an outbreak of plague in the early eighteenth century led to food shortages and rising prices, which in turn provoked large-scale urban unrest (Hays 2005, 138–140). During the early months of the COVID-19 pandemic, Lebanese citizens protested against food shortages despite government lockdowns (Mazjoub 2020; Mounzer 2020). Similarly, temporary

food shortages created by the government's lockdown measures resulted in protests in Chile (Fuentes 2020).

The effects of economic grievances and resource scarcity on social unrest in the context of pandemics are highlighted by recent analyses of protest during the COVID-19 pandemic. For example, disaggregating COVID-19 restriction by type, Wood et al. (2022) found that workplace closures—which were most likely to have a direct adverse impact on the economic well-being of citizens—had the largest substantive impact on the frequency of social unrest. Moreover, both Wood et al. (2022) and Farzanegan and Gholipour (2023) show that the introduction of policies intended to offset the economic grievances associated with pandemic restrictions (e.g., cash transfers to citizens, low-interest loans, financial support for industry, etc.) moderated the influence of restrictions on unrest. Consequently, government that sought to ameliorate the economic burden of COVID-19 restrictions tended to experience lower levels of unrest.

Epidemics may also worsen public mistrust of authorities by exacerbating and reinforcing existing social and ethnic cleavages. In particular, where class, religion, or ethnicity separate the authorities from populations in areas where the epidemic takes hold, suspicion, and resistance are more common. For example, experimental evidence from Guinea suggests that members of marginalized groups express greater mistrust of the government and are less likely to follow public health advisories on HIV/AIDS prevention when representatives of the national government deliver health recommendations compared to local religious or political leaders (Arriola and Grossman 2020). In addition to decreasing compliance with health recommendations, suspicion, and mistrust of authorities during public health crises can also facilitate unrest. Longstanding mistrust of Tsarist (Russian) authorities by the local Central Asian population coupled with resentment toward government efforts to contain an outbreak of cholera in the predominantly Asian parts of the city sparked inter-communal riots (and reciprocal violence) in Tashkent in 1892 (Sahedeo 2005). In a similar manner, restrictions that contradicted or impeded cultural and religious practices sparked riots during outbreaks of plague in India and cholera in Europe and the US (Evans 1988; Cohn 2018, 143). Barcelo et al. (2022) find that states that have a history of being repressive were more likely to adopt restrictive pandemic policies in 2020 (in response to COVID-19) and keep them in place longer. Hillhorst and Mena (2021) qualitatively analyze several countries with long histories of social conflicts and their response to COVID-19. They find that across several cases, COVID responses were shaped by pre-existing fault lines in social conflict, and though reduced spread of the disease, often exacerbated pre-existing inequalities and made vulnerable groups more vulnerable in other ways. As these examples suggest, epidemics as well as the rules states adopt to quell them often exacerbate social pre-existing cleavages and provoke public resentment, thereby increasing the odds of resistance.

Finally, epidemics can also expand opportunities for collective mobilization by weakening the monitoring and sanctioning capabilities of state authorities. This occurs principally as a result of the detrimental impact of infectious diseases on the preparedness, fighting effectiveness, and organizational competencies of security services (Enemark 2009; Peterson 2002; Bailey 2013). For example, during the early years of the American Revolution, sporadic outbreaks of smallpox hindered recruitment, increased the rate of desertion, and reduced the fighting capacity of Colonial forces (Becker 2004). Similarly, influenza infection among US

troops reportedly contributed to their poor performance in the Meuse–Argonne Offense in 1918 (Byerly 2005; Price-Smith 2008). Because police routinely serve as first responders and interact closely and frequently with the public, infection rates within the police forces are often relatively high (Jennings and Perez 2020; Laufs and Waseem 2020). Rising infection rates among members of the security services reduce the number of officers available to patrol the streets, monitor the actions of dissident groups, or respond to unrest when it occurs. In a similar manner, ensuring compliance with new pandemic restrictions (e.g., quarantines, curfews, travel restrictions, etc.) creates additional pressures on police and can strain their human capital and organizational capacity. Enforcement of these regulations often produces tensions between the police and the community, threatens public trust in the police, and reduces community cooperation with policing efforts (Laufs and Waseem 2020). These factors in turn increase the costs of monitoring and sanctions, thus potentially creating space of public resistance. Because declining repressive capacity represents a key political opportunity factor that facilitates dissent (Brockett 1991), epidemics may create new windows of opportunity for social unrest.

As the previous discussion highlights, several theoretical mechanisms potentially link the occurrence of disease epidemics and the incidence or rate of social unrest. The argument suggests that sustained outbreaks of communicable diseases, as well as government responses to them, may incentivize or create conditions conducive to acts of resistance and dissent by the affected communities. We thus derive the following testable hypothesis:

H1: *Disease epidemics are associated with an increase in the prevalence of social unrest in the geographic areas in which they occur.*

While we argue that epidemics generally create both grievances that incentivize dissent and opportunities that facilitate mobilization, we also anticipate that the relationship between the severity of epidemics and the frequency of unrest is non-linear. Specifically, we expect that the influence of epidemics on unrest diminishes as the rate of infections and deaths climbs to very high levels. The reasons for this, we argue, relate to the divergent effects of disease prevalence on incentives for opposition (e.g., grievances) and opportunities for collective action and the countervailing influences these factors exert on the likelihood of unrest. This reflects the logic articulated by Wood et al. (2022), which sought to show that the effect of a given restriction imposed by authorities during the COVID-19 pandemic on social unrest depended on the way the policy affected both citizens' grievances as well as their opportunities for mobilization. Their findings suggest that policies that simultaneously created grievances and reduced the barriers to mobilization (e.g., workplace closures) had a stronger influence on unrest than those that created grievances but also restricted opportunities for mobilization (e.g., closing public transport).

In a similar manner, we expect that beyond a certain threshold, increases in the severity of the epidemic will act as a constraint on opportunities for unrest even though rising severity is likely to continue to intensify citizens' grievances. Rising rates of infection and death rates increasingly disrupt normal patterns of social and economic interactions, raising frustration, anxiety, and anger among the public. Grievances are often further exacerbated by the policies adopted by authorities to slow or halt the spread of disease, which typically become more restrictive as the severity of the epidemic increases. Hence, grievances increase in line

with increases in epidemic severity. On the other hand, opportunities for mobilization are likely to decline beyond a certain threshold of severity. Cost perception is a key feature of an individual's decision to engage in collective action. In the case of anti-government protests, scholars often highlight the role of repression as an important deterrent to mobilization—individuals that perceive a high likelihood of sanctions (arrest, police abuse, etc.) are less likely to engage in costly collective action (e.g., Lichbach 1987; Opp and Roehl 1990). It is for this reason that previous scholars highlight how changes in repressive capacity of the state represent key opportunities for mobilization (e.g., Brockett 1991).

In the case of pandemics, fears of exposure to a lethal pathogen may exert a similar deterrent effect. In other words, in the context of very high infection and death rates, even aggrieved citizens are less likely to engage in unrest because they perceive a high likelihood of exposure and infection. Indeed, in many European countries, protest activity against COVID-19 restrictions tended to increase during periods of relatively low disease prevalence and mortality and decrease as infection rates and deaths spiked (Neumeyer, Pfaff, and Plümper 2023). Additionally, more severe epidemics tend to produce more severe restrictions as well as more severe sanctions for violating those restrictions, both of which act as constraints and opportunities for mobilization. For example, as in the case of COVID-19, authorities might begin by placing limits on some forms of travel or restricting large group gatherings, which are likely to produce grievances but may not create substantial barriers to mobilization. However, as disease and mortality rates increase, restrictions often become more severe. Compared to many other types of restrictions, stay-at-home orders and quarantines imposed on large geographic areas represent severe constraints on opportunities for collective mobilization, particularly if violations of these orders result in substantial penalties. Consequently, we anticipate:

H2: *Severity of the epidemic exerts a non-linear influence on the frequency of unrest, such that the effect of the magnitude of the epidemic on unrest diminishes in the context of particularly severe epidemics.*

Data and Methods

Data Sources and Measures

We evaluate these hypotheses by analyzing fine-grained, geo-located data on the presence of epidemics and prevalence of social unrest events (demonstrations and riots). We construct our sample by merging information on epidemics from the Center for Research on the Epidemiology of Disasters (CRED) Emergency Events Database (EM-DAT) International Disaster Database (CRED 2020)[3] and events data on social unrest activities from the Social Conflict Analysis Database (SCAD; Salehyan et al. 2012).[4] Because the information contained in both datasets is geo-referenced, we are able to examine the co-variation in disease outbreaks and dissent at a low level of geographic aggregation.

We organize our data at the level of the first-order administrative unit-year (state, district, commune, etc.). We use the administrative unit as the spatial unit for three reasons. Principally, the socio-political implications of epidemics are often observed at the local level. Additionally, the epidemics included in EM-DAT are tagged with the name of the geo-

---

[3]To the best of our knowledge, EM-DAT is the most reliable source of cross-national, geo-located information on epidemics currently available.

[4]Previously known as the *Social Conflict in Africa Database*.

graphic location (up to and including the first-order administrative level), the type of disease, the dates of the epidemic outbreak, and the total number of deaths and individuals affected by the epidemic. Finally, we prefer to use administrative units over grid squares because the former allows us to leverage the information inherent in political boundaries, while the latter are strictly arbitrary geographic units that ignore important political, social, cultural, and topographical factors that often explain the way administrative unit boundaries are drawn.

While EM-DAT includes qualitative information on the locations in which disease outbreaks occurred, the geographic reference provided does not always include the name of the first-order administrative unit. Rather, EM-DAT often lists the name of the municipality, district, or other sub-national unit place name. Consequently, the data require processing in order to aggregate the epidemics to the appropriate unit of analysis. In order to spatially join information on epidemics and social unrest at the first-order administrative level, we first geocoded each epidemic in the EM-DAT dataset. This process required parsing the unique locations (e.g., village or city names) for disease outbreaks in the data from a list of multiple locations and using dictionaries of place names to assign each epidemic to a first-order administrative region. Merging these two distinct datasets results in a pre-matched sample of 27,664 first-order administrative unit-years, representing events in sixty African and Latin American countries between 1990 and 2017.[5] As we discuss below, we also estimate the effect of epidemics on social unrest using a matched subset of 3,778 first-order administrative-year units.

A measure of social unrest constructed from information available in SCAD serves as the dependent variable in our analyses. *Social Unrest* represents a count of the total number of all organized and spontaneous demonstrations or riots that take place within a first-order administrative unit in a given year.[6] We do not include events like strikes, armed attacks, or state-based violence in our measure of social unrest. We exclude events where the sub-national location is unspecified and where a first-order administrative unit cannot be assigned due to missing information.[7]

The epidemics reported in EM-DAT comprise a variety of communicable diseases (e.g., cholera, Ebola, influenza, typhoid, and yellow fever). To be included in the dataset, a disease outbreak must meet at least one of the following conditions: more than ten people died, more than hundred people were affected, the country's government declared a state of emergency, or the country made a formal call for international assistance. In our first analysis, we rely on a binary variable that is able to capture sub-national variation in the locations in which the epidemic occurred. The variable *Epidemic* is coded "1" if an epidemic took place in the given administrative unit during a year and "0" otherwise.

In our second analysis, we include an estimate of the severity of disease outbreak (e.g., annual count of deaths) as our primary predictor. We divide the epidemic's total death measure into three categories: "low," "moderate," and "severe." Epidemics that incurred between 10 and 99 deaths are assigned to the low category. Epidemics that experienced between 100 and 999 deaths are assigned to the moderate category. Countries that suffered over 999 deaths are assigned to the severe category. Unfortunately, however, EM-DAT only provides a single, event-level measure of epidemic severity and does not disaggregate the death toll by the first-order administrative unit. Therefore, this measure is simply an indication of whether a first-order administrative unit was affected by an epidemic that was recorded as low, moderate, or severe magnitude rather than a true estimate of the severity of the epidemic in that specific sub-national level. Accordingly, epidemics across multiple units within the same country receive the same severity score. Figures 1 and 2 display the spatial distribution of all recorded social unrest events from 1990 to 2017, represented by blue points, and the total number of epidemic outbreaks within a first-order administration for the same period, with darker shades indicating a greater number of epidemics in a unit.

We account for a range of unit-specific and national-level confounders that might influence the likelihood of social unrest in our models. First, we control for temporal and spatial dependence. To address possible temporal autocorrelation, we include a one-period lag of the dependent variable in all of our models (*Social Unrest*$_{t-1}$). We likewise create a spatially weighted version of our dependent variable, *Spatially Weighted Lag Social Unrest,* using a row-standardized approach that divides each neighbor weight by the sum of all neighbor weights. We also account for state repression against dissident activities within the administrative unit in the prior year because repression and dissent are often reciprocal responses (*Repression*$_{t-1}$). This lagged binary measure is constructed from information in SCAD and indicates that state forces employed coercive violence against at least one dissent event in the previous year.

We control for the *Population Density* of the administrative unit under observation because greater densities of inhabitants facilitate collective action and are also linked to the spread of communicable disease. This log-transformed indicator is taken from the Center for International Earth Science Information Network (CIESIN) Gridded Population of the World dataset (CIESIN 2005). Poor development and poverty are also linked to both the likelihood of social unrest and prevalence of disease outbreaks. We, therefore, proxy unit-level wealth with the natural logarithm of total *Stable Night Light* for a first-order administrative unit in a given year using the DMSP-OLS Nighttime Lights Time Series dataset from the US Air Force Weather Agency (n.d.).[8] We control for *Conflict Intensity* due to the negative effect that civil conflict has on the security and living conditions within society, which can increase the likelihood of protests and violent riots. This indicator reflects the natural logarithm of the total number of civilian fatalities generated by armed conflict occurring in a first-order administrative unit in a given year using the Uppsala Conflict Data Program's Georeferenced Event Dataset (Sundberg and Melander 2013). We also control for whether a politically excluded group resides within a first-order administrative unit within a given year to account for a potential increase in the number of social unrest events due to ethnically based grievances. *Politically Excluded Group*

---

[5]Currently, *SCAD* coverage of Latin America consists of Mexico, Central America, and the Caribbean for the years in our sample.

[6]Although beyond the scope of this current project, we have conducted some alternative analyses where we modeled demonstrations and riots separately, finding largely similar results. The results for the presence of epidemics mirrored our findings below, although the evidence of a curvilinear effect of the severity of the epidemic was not as clear-cut for rioting events. A potentially fruitful avenue for future research is to more fully explore the specific pathways for riots and how they differ from demonstrations during epidemics.

[7]This includes a total of 2,798 events (12 percent of observations) consisting of 2,128 nationwide events, 592 events where the sub-national location is unknown, and 78 events where the latitude and longitude coordinates are not recognized by GIS software.

[8]We use stable night light data as a proxy for economic development because of the questionable reliability of sub-national GDP data (see Sutton et al. 2007; Chen and Nordhaus 2011). We use linear interpolation to impute missing values for our sub-national measures of *Population Density* and *Stable Night Light* as neither measure is provided on an annual basis from 1990 to 2017.
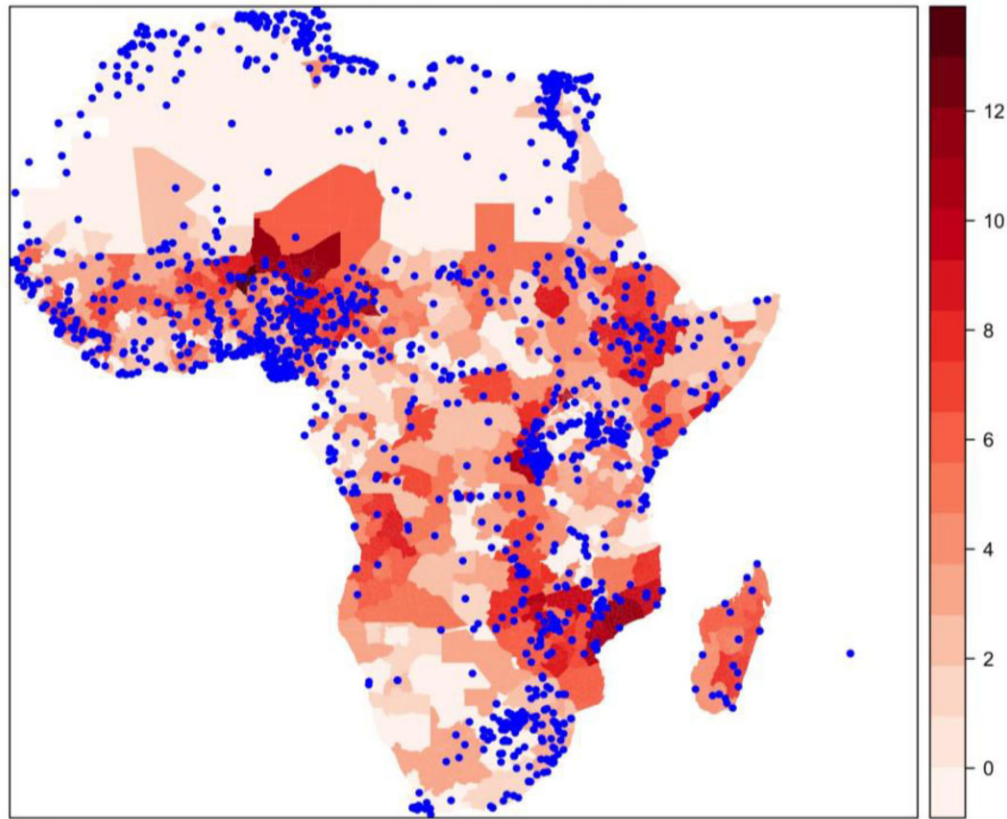
Figure 1. Spatial distribution of social unrest and epidemics in Africa, 1990–2017.
Note: Blue points represent the location of a social unrest event using SCAD. Darker-shaded first-order administrative units indicate a greater number of epidemic outbreaks using EM-DAT.
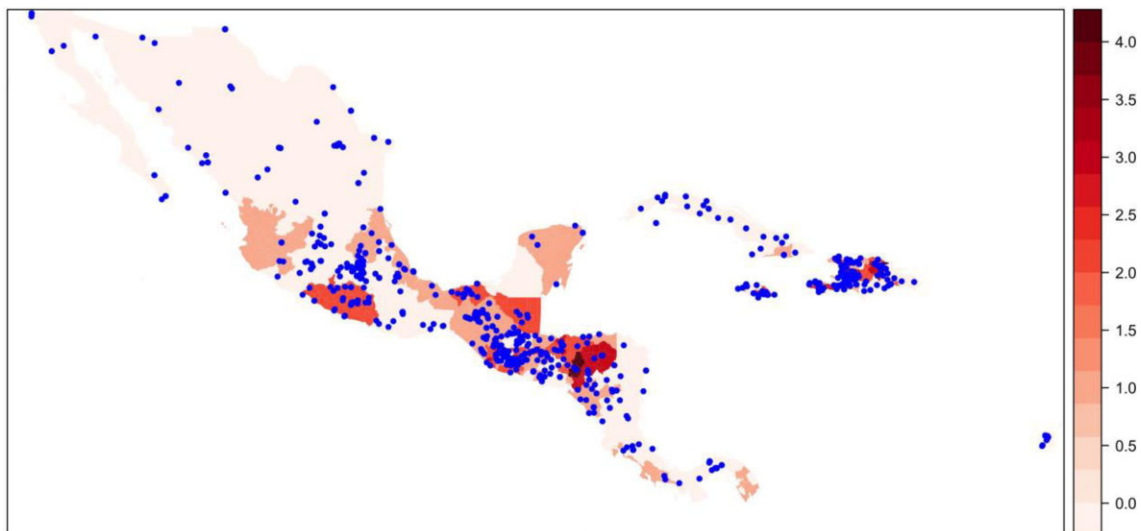
Figure 2. Spatial distribution of social unrest and epidemics in Latin America, 1990–2017.
Note: Blue points represent the location of a social unrest event using SCAD. Darker-shaded first-order administrative units indicate a greater number of epidemic outbreaks using EM-DAT.

is a binary indicator denoting that at least one identified communal group resident in the unit was considered powerless, discriminated against, or self-excluded from executive state power according to the Geo-referencing Ethnic Power Relations dataset (Vogt et al. 2015).

Country-year indicators include *Democracy*, *GDPpc*, *GDP Growth*, *Population*, *Federalism*, and *HIV*. For our *Democracy* indicator, we use Coppedge et al. (2021) Varieties of Democracy (V-Dem) electoral democracy measure. We control for a country's level of democracy as previous research indicates

democratic countries are more likely to experience social unrest and better able to respond to disease outbreaks. Information on *GDP Growth, GDPpc,* and *Population* are taken from World Bank (2021) World Development Indicators Dataset (WDI). *GDP Growth* indicates the annual percentage of GDP growth. *GDPpc* and *Population* are log-transformed. *Federalism* is a dummy variable indicating whether or not the country has a federal system. We include this measure because of the greater control administrative units have in responding to public health crises in federal systems. We also account for the prevalence of *HIV* in a country because of the substantial burden the disease has inflicted on public health systems in many countries in sub-Saharan Africa, which arguably impede a state's ability to effectively respond to new epidemics. We use the natural logarithm of the number of HIV-infected persons in a country in a given year using the UNAIDS (2020) dataset. For our *Press Freedom* indicator, we use Coppedge et al. (2021) V-Dem government censorship measure. We control for a country's press freedom as media attention may affect the likelihood of a social unrest event or epidemic being reported on and being included in our dataset. We include a table of descriptive statics for the pre-matched sample in the appendices (table A1 in online appendix A).

Estimator and Identification Strategy

We employ multi-level Poisson models controlling for random and fixed effects to estimate the count of unrest events in an administrative district in a given year. This method accounts for the hierarchical structure of our data, which includes first-order administrative units nested within countries.[9] In order to best approach causal inference, as well as to reduce bias and improve our estimation of the effect of disease outbreaks on social unrest, we employ Mahalanobis distance matching to create a matched sample of first-order administrative-year units (see King and Nielsen 2019). Observational studies are limited by their ability to accurately estimate causal effects due to the non-random assignment of observations to the treatment group (epidemic). To overcome this limitation, we create a matched sample of 3,778 first-order administrative unit-year units from our initial sample of 27,664 administrative unit-year units that have similar distributions in the treatment and control group on observable confounders that are most likely to predict whether a first-order administrative unit experiences an epidemic in a given year. This preprocessing step ensures that those units in the treatment group (presence of epidemic) are more comparable to those units in the counterfactual control group (absence of epidemic). In light of previous findings that link disease outbreaks to units with larger populations, lower economic development, prevalence of conflict, and level of democracy we match cases based on *Population Density, Stable Night Light, Conflict Intensity (log), Democracy, Population (log), and GDPpc (log).* We also include the variable *Physicians per 1,000* in the matching stage because epidemics are influenced by the strength of a state's health infrastructure. This indicator reflects the estimated number of physicians per 1,000 people for each country in a given year and comes from WDI (World Bank 2021). We include imbalance statistics for the pre- and post-matched samples in table A2 in online appendix A. The overall multivariate imbalance L1 decreases from 0.96 to 0.80 post-matching. To avoid post-treatment bias and ensure that matched observa-

tions have the same covariate history and are independent from one another, we match each treated unit to a control unit in the same time period using the average values for each matching variable 3 years prior to the treatment year. As a robustness test, we use a negative binomial model to account for potential overdispersion in the data in tables A3 and A4 in online appendix A. The results are similar regardless of the distributional assumptions we make.[10]

Results

Models 1–4 display the results for analyses of the relationship between epidemics and the aggregate number of *Social Unrest* events. We test *H1* in table 1 using our *Epidemic* dummy variable and *H2* in table 2 using our categorical *Epidemic Severity* measure. Models 1 and 2 display results using the pre-matched sample. Models 3 and 4 display results for the post-matched sample. Models 1 and 3 represent baseline models that include only the independent variable and key administrative-level control variables. Models 2 and 4 constitute the full models and include our independent variable and all the control variables. The results provide support for our hypotheses. As shown in table 1, Models 1–4, the coefficient for *Epidemic* is positive and statistically significant. In table 2, the coefficients for *Epidemic Severity* are positive and statistically significant for low and moderate epidemics but negative and non-significant for severe epidemics. Together, these findings provide empirical support for *H1 and H2.*

In order to evaluate the substantive effects of our findings, we examine the marginal effects of our *Epidemic* and *Epidemic Severity* variables on the probability of observing social unrest events. The marginal effects are calculated as a change from the baseline value of no epidemic while holding all control variables at their mean. We limit the discussion of the marginal effects using the full model in our post-matched sample (model 4) because these are the outcomes for which our results are most robust. For our *Epidemic* binary variable, the probability of observing a social unrest event increases by 18 percent when a first-order administrative unit experiences an epidemic outbreak. For our *Epidemic Severity* variable, we present the marginal effects in figure 3. Because social unrest is a relatively rare event, the marginal effect of the *Epidemic Severity* variable on the predicted probability of observing any social unrest in a given unit-year is quite small; however, the *change* in the marginal effects for those units without an epidemic compared to those with low and moderate severity is substantively large. Based on the marginal effects presented in figure 3, the probability of observing a single *Social Unrest* event is expected to increase by 17 percent when a first-order administrative unit experiences an epidemic outbreak of low severity and 18 percent when it experiences an epidemic of moderate severity. However, as expected, the relationship between an epidemic's severity is non-linear, with the probability of a social unrest event decreasing by 12 percent when a severe epidemic outbreak takes place in a first-order administrative unit. As these results illustrate, the substantive effect of epidemics on unrest is non-trivial.

Discussion and Conclusion

Disease outbreaks can produce intense feelings of fear, anger, resentment, and alienation among the populations they affect. Anecdotal evidence from historical cases and

---

[9]We follow the approach recommended by Langford, Bentham, and McDonald (1998).

[10]Here, we follow the recommendations of Imai et al. (2020).

Table 1. Multi-level Poisson regression results, epidemic binary variable

	Model 1	Model 2	Model 3	Model 4
	Social unrest		Social unrest	
	Pre-matched sample		Post-matched sample	
Administrative unit-level variables				
Epidemic	0.10***	0.06*	0.11**	0.18***
	(0.03)	(0.04)	(0.06)	(0.06)
Population density‡	0.31***	0.19***	0.20***	0.14***
	(0.03)	(0.03)	(0.04)	(0.04)
Stable night lights‡	0.51***	0.33***	0.50***	0.56***
	(0.02)	(0.03)	(0.05)	(0.05)
Conflict intensity‡	0.21***	0.17***	0.22***	0.17***
	(0.01)	(0.01)	(0.02)	(0.02)
Politically excluded group	0.00	0.09	−0.18	−0.11
	(0.11)	(0.13)	(0.18)	(0.18)
Spatially weighted lag social unrest		0.23***		0.35***
		(0.01)		(0.04)
Social unrest$_{(t-1)}$		0.01***		0.03***
		(0.00)		(0.01)
Repression$_{(t-1)}$		0.28***		0.36***
		(0.03)		(0.07)
Country-level variables				
Democracy		−0.56***		−1.14**
		(0.18)		(0.45)
GDPpc‡		−0.11		−0.43***
		(0.07)		(0.12)
GDP growth		0.01***		−0.02***
		(0.00)		(0.01)
Population‡		0.14		−0.18
		(0.08)		(0.12)
Federalism		−0.40		0.52
		(0.53)		(0.40)
HIV cases‡		0.24***		−0.04
		(0.03)		(0.06)
Press freedom		0.25***		0.17**
		(0.03)		(0.08)
Constant	−8.91***	−10.69***	−7.83***	−1.25
	(0.28)	(1.16)	(0.46)	(1.80)
Observations	26880	23498	3778	3742
Log likelihood	−14406.88	−11805.37	−2485.72	−2310.89
AIC	28829.77	23646.73	4987.43	4657.78
BIC	28895.36	23791.89	5037.33	4769.87

Notes: Coefficients with standard errors in parentheses (two-tailed test). ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$, and ‡ = natural log.

contemporary media reports of the COVID-19 pandemic further suggest that epidemics may create conditions conducive to social unrest. We have therefore sought to identify the theoretical linkages between disease and dissent and to systematically evaluate the potential empirical relationship between the two events. We described several mechanisms through which unrest potentially emerges as a societal response to how governments tackle the spread of infectious diseases. First, anger and mistrust of the state's response to the epidemic may induce backlash and spur dissent. These responses occur when the government's responses are deemed inadequate or because the public perceives the policies as an intrusive overreach by local or national authorities. Unrest may also emerge from more indirect pathways, such as from grievances related to increased economic hardship, resource scarcity, or scapegoating of specific groups. In either scenario, the odds of popular mobilization or acts of violent dissent are expected to increase. Our empirical results are largely consistent with these expectations.

Our argument and results are both timely and relevant to scholars of international politics, global health researchers, and policy makers. The advent and rapid global diffusion of the novel coronavirus responsible for the COVID-19 pandemic has not only created a global public health crisis but also produced political and social turmoil in many states. As many of the examples in this article illustrate, the sociopolitical implications of the COVID-19 outbreak are often observed at the local level and in some circumstances include protests, demonstrations, riots, and state repression. Yet, as our results demonstrate, the relationship between epidemics and unrest is not unique to the contemporary COVID-19 pandemic. Given the high likelihood of witnessing future pandemics (Fan, Jameson, and Summers 2018), our findings should serve as the basis for additional research in this area of inquiry. Most importantly, understanding the manner in which populations respond to disease outbreaks as well as how groups and individuals perceive the legitimacy and necessity of government efforts to control the disease are crucial factors in determining the success of pan-

Table 2. Multi-level Poisson regression results, epidemic severity variable

|	Model 1	Model 2	Model 3	Model 4
		Social unrest		*Social unrest*
		Pre-matched sample		*Post-matched sample*
Administrative unit-level variables				
Low (10–99 deaths)	0.14***	0.09*	0.16**	0.17**
	(0.05)	(0.05)	(0.07)	(0.07)
Moderate (100–999 deaths)	0.25***	0.16***	0.23***	0.18**
	(0.06)	(0.06)	(0.08)	(0.08)
Severe (>999 deaths)	−0.04	−0.07	−0.08	−0.12
	(0.09)	(0.09)	(0.11)	(0.11)
Population density‡	0.31***	0.19***	0.20***	0.14***
	(0.03)	(0.03)	(0.04)	(0.04)
Stable night lights‡	0.52***	0.33***	0.50***	0.57***
	(0.02)	(0.03)	(0.05)	(0.05)
Conflict intensity‡	0.21***	0.17***	0.22***	0.17***
	(0.01)	(0.01)	(0.02)	(0.02)
Politically excluded group	0.01	0.09	−0.19	−0.12
	(0.11)	(0.13)	(0.18)	(0.18)
Spatially weighted lag social unrest		0.23***		0.34***
		(0.01)		(0.04)
Social unrest$_{(t-1)}$		0.01***		0.03***
		(0.00)		(0.01)
Repression$_{(t-1)}$		0.28***		0.34***
		(0.03)		(0.07)
Country-level variables				
Democracy		−0.55***		−1.00**
		(0.18)		(0.46)
GDPpc‡		−0.11		−0.43***
		(0.07)		(0.12)
GDP growth		0.01***		−0.03***
		(0.00)		(0.01)
Population‡		0.14**		−0.16
		(0.08)		(0.12)
Federalism		−0.42		0.48
		(0.53)		(0.41)
HIV cases‡		0.24***		−0.05
		(0.03)		(0.06)
Press freedom		0.25***		0.17**
		(0.03)		(0.08)
Constant	−8.94***	−10.76***	−7.91***	−1.59
	(0.28)	(1.16)	(0.46)	(1.85)
Observations	26880	23498	3778	3742
Log likelihood	−14399.39	−11801.90	−2481.02	−2309.40
AIC	28818.78	23643.79	4982.03	4658.81
BIC	28900.77	23805.08	5044.4	4783.35

Notes: Coefficients with standard errors in parentheses (two-tailed test). ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$, and ‡ = natural log.

demic responses. Where individuals remain suspicious of public health and political authorities, successful interventions are at greater risk of failure (Dionne 2018; Arriola and Grossman 2020). Moreover, where the disease or government responses exacerbate these sentiments, dissent, and unrest are more likely. Such actions, even when undertaken in response to unfair, uneven, or illegitimate state policies, risk worsening the epidemic by increasing transmission and weakening already strained public health infrastructure.

Our findings suggest several areas for future research. First, scholars investigating this topic should explicitly explore and evaluate the influences of the specific mechanics we describe. For example, it is possible that community-level fear and anxiety produced by a disease outbreak are sufficient conditions to provoke unrest. If this is the case, then epidemics might be directly causally linked to riots and demonstrations. Yet, there is little reason to believe that

fear alone lowers the barriers to collective action or facilitates mobilization. Rather, it is more likely that specific actions undertaken by government authorities serve as focal points for popular actions. In this sense, containment strategies and government policies intended to arrest the spread of the diseases are more likely to drive unrest. At the least, these strategies should serve to moderate or condition the underlying fears or tensions created by the disease. Scholars should therefore consider the effects of the specific policies adopted by governments during an epidemic on the probability or frequency of dissent activities. For example, rapid deliveries of medical supplies and expansions of the public health infrastructure may reassure the public and minimize dissent, while the imposition of quarantines or economic lockdowns is more likely to spur unrest.

Scholars should also more thoroughly map the complex causal sequences that potentially link epidemics and un-
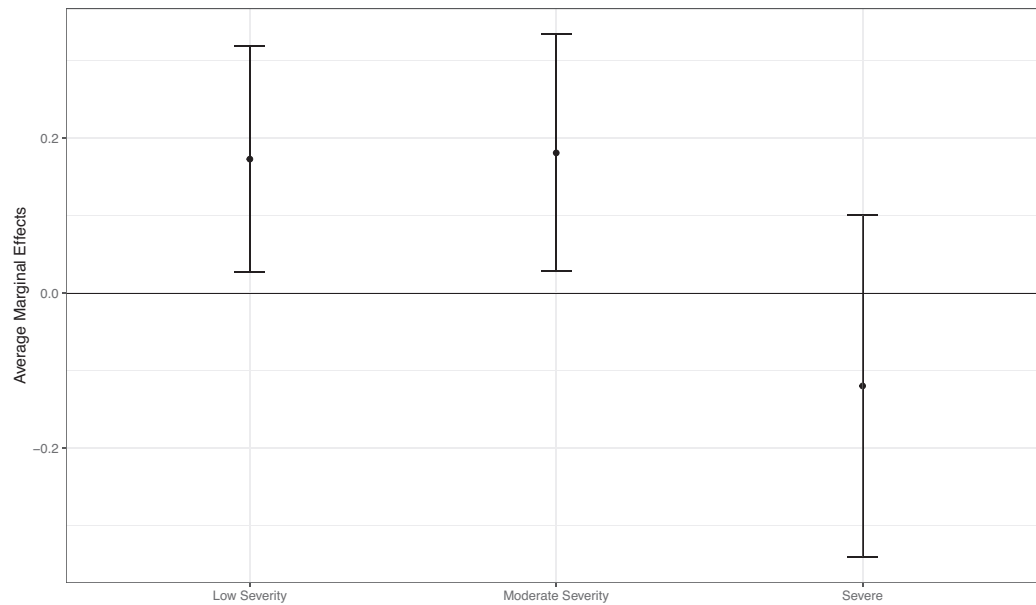
Figure 3. Average marginal effect of epidemic severity variable.
Note: Average marginal effect of the *Epidemic Severity* variable on the probability of social unrest events respectively in first-order administrative units with 95 percent confidence intervals. Based on results from table 2, Model 4. Marginal effects are calculated as change from the baseline value of no epidemic.

rest. For instance, epidemics result in the adoption of specific public health policies. Such mitigation strategies might, in turn, contribute to economic upheaval and disruption (Sly 2020), which then acts as the proximate stimulus of unrest. Indeed, much of the economic cost resulting from the COVID-19 pandemic stems from lockdowns and stay-at-home orders rather than the disease itself. As such, the mechanisms we identify herein may interact to influence the likelihood of social unrest rather than representing independent causal factors. Some of these potential relationships include how epidemics and the economy interact with pre-existing social fault lines, which could exacerbate long-standing grievances within society. In particular, as contemporary reporting on the COVID-19 pandemic suggests, the adverse consequences of epidemics are often most acute among populations that already suffer from poverty, exclusion, and marginalization. Disease outbreaks are likely to intensify these conditions, and thus the combination of rising mortality and morbidity among a distinct population, worsening economic conditions, and (often) uneven discriminatory government responses may jointly produce severe social discord and violent unrest.

In addition to research that examines the impact of specific types of epidemic response policies and how those interact with economic and social conditions, a fruitful direction of future inquiry would also be to examine the role of both national and sub-national political and economic institutions. While our models above controlled for whether states were democratic, national economic development levels, and whether the regions' states had federal institutional arrangements, there is room in future work for exploring potential conditional relationships. Future work can and should more deeply examine the role that democratic and autocratic governance play in epidemic responses, public health delivery, and their responses to grievances that emerge.

Supplementary Information

Supplementary information is available at the *Global Studies Quarterly* data archive.

References

Albertson, Bethany, and Sarah Kushner Gadarian. 2015. *Anxious Politics: Democratic Citizenship in a Threatening World.* Cambridge: Cambridge University Press.

Arriola, Leonardo, and Allison Grossman. 2021. "Ethnic Marginalization and (Non)Compliance in Public Health Emergencies." *The Journal of Politics* 83(3): 807–20.

BBC. 2014a. "Ebola: Guineans Riot in Nzerekore Over Disinfectant." *BBC Online.* Accessed August 29, 2014. https://www.bbc.co.uk/news/world-africa-28984259.

———. 2014b. "Ebola Crisis: Liberia Police Fire on Monrovia Protest." *BBC Online.* Accessed August 21, 2014. https://www.bbc.co.uk/news/world-africa-28879471.

———. 2020. "Coronavirus: Extra police enforce German tower block quarantine." *BBC Online* 22 June 2020. Available: https://www.bbc.co.uk/news/world-europe-53131941

Bailey, Mark. 2013. "A Brief History of British Military Experiences with Infectious and Tropical Diseases." *Journal of the Royal Army Medical Corps* 159(3): 150–7.

Barcelo, Joan, Robert Kubinec, Cindy Cheng, Tiril Hoye Rahn, and Luca Messerschmidt. 2022. "Windows of Repression: Using COVID-19 Policies Against Political Dissidents?" *Journal of Peace Research* 59(1): 73–89.

Becker, Ann. 2004. "Smallpox in Washington's Army: Strategic Implications of the Disease during the American Revolutionary War." *The Journal of Military History* 68(2): 381–430.

Beckett, Lois. 2020. "Armed Protesters Demonstrate Against COVID-19 Lockdown in Michigan Capitol." *The Guardian.* Accessed April 30, 2020. https://www.theguardian.com/us-news/2020/apr/30/michigan-protests-coronavirus-lockdown-armed-capitol.

Bellemare, Marc. 2015. "Rising Food Prices, Food Price Volatility, and Social Unrest." *American Journal of Agricultural Economics* 97(1): 1–21.

Blair, Robert, Benjamin Morse, and Lily Tsai. 2017. "Public Health and Public Trust: Survey Evidence from the Ebola Virus Disease Epidemic in Liberia." *Social Science & Medicine* 172: 89–97.

Bohlken, Anjali Thomas, and Ernest Sergenti. 2010. "Economic Growth and Ethnic Violence: An Empirical Investigation of Hindu–Muslim Riots in India." *Journal of Peace Research* 47(5): 589–600.

Bremner, Charles. 2020. "Coronavirus: Young Protesters Clash with French Police on Locked-Down Estates." *The Times.* Accessed April 21, 2020. https://www.thetimes.co.uk/article/paris-protests-turn-violent-on-locked-down-housing-estates-s3ckpb8lp.

Boundreau, Vincent. 1996. "Northern Theory, Southern Protest: Opportunity Structure Analysis in Cross-National Perspective." *Mobilization: An International Quarterly* 1(2): 175–89.

Brockett, Charles. 1991. "The Structure of Political Opportunities and Peasant Mobilization in Central America." *Comparative Politics* 23(3): 253–74.

Byerly, Carol. 2005. *Fever of War: The Influenza Epidemic in the US Army in World War I.* New York, NY: New York University Press.

Carey, Sabine. 2006. "The Dynamic Relationship between Protest and Repression." *Political Research Quarterly* 59(1): 1–11.

Chen, X, and W.D. Nordhaus 2011. "Using Luminosity Data as a Proxy for Economic Statistics." *Proceedings of the National Academy of Sciences* 108(21): 8589–94.

CIESIN, Columbia University, and Centro Internacional de Agricultura Tropical—CIAT. 2005. *Gridded Population of the World, Version 3 (GPWv3): Centroids.* Palisades, NY: NASA Socioeconomic Data and Applications Center (SEDAC). 10.7927/H4TT4NWQ

Cohn, Samuel, Jr. 2018. "Fear and the Corpse: Cholera and Plague Riots Compared." In *Histories of Post-Mortem Contagion. Medicine and Biomedical Sciences in Modern History,* edited by C. Lynteris and N. Evans, Cham: Palgrave Macmillan.

Coppedge, Michael, John Gerring, Carl Henrik Knutsen, Staffan I. Lindberg, Jan Teorell, Nazifa Alizada, and David Altman et al. 2021. "V-Dem [Country–Year/Country–Date] Dataset v11.1." Varieties of Democracy Project. 10.23696/vdemds21

CRED. 2020. *EM-DAT, International Disaster Database.* Université catholique de Louvain (UCL), D. Guha-Sapir. Brussels, Belgium. www.emdat.be.

Della Porta, Donatella. 2008. "Protest and Unemployment: Forms and Opportunities." *Mobilization: An International Quarterly* 13(3): 277–95.

Di Donato, Valentina, and Angela Dewan. 2020. "Protesters Clash with Police in Northern Italy as Anger Mounts over COVID-19 Restrictions." *CNN Online.* Accessed October 27, 2020. https://edition.cnn.com/2020/10/27/europe/italy-coronavirus-protests-intl/index.html.

Dionne, Kim Yi. 2011. "The Role of Executive Time Horizons in State Response to AIDS in Africa." *Comparative Political Studies* 44(1): 55–77.

———. 2018. *Doomed Interventions: The Failure of Global Responses to AIDS in Africa.* New York: Cambridge University Press.

Drury, A. Cooper, and Richard Stuart Olson. 1998. "Disasters and Political Unrest: An Empirical Investigation." *Journal of Contingencies and Crisis Management* 6(3) 153–61.

Evans, Richard. 1988. "Epidemics and Revolutions: Cholera in Nineteenth Century Europe." *Past and Present* 120(1): 123–46.

Enemark, Christian. 2009. "Is Pandemic Flu a Security Threat." *Survival* 51(1): 191–214.

Fan, Victoria, Dean Jamison, and Lawrence Summers. 2018. "Pandemic Risk: How Large Are the Expected Losses." *Bulletin of the World Health Organization* 96(2): 129–34.

Farzanegan, Mohammad Reza, and Hassan Gholipour. 2023. "COVID-19 Fatalities and Internal Conflict: Does Government Economic Support Matter?" *European Journal of Political Economy* 78: 102368. https://doi.org/10.1016/j.ejpoleco.2023.102368. 10.1016/j.ejpoleco.2023.102368

Fuentes, Valentina. 2020. "Protests Over Food Shortages Erupt in Chile Amid Virus Lockdown." *Bloomberg* Accessed May 19, 2020. https://www.bloomberg.com/news/articles/2020-05-19/protests-over-food-shortages-erupt-in-chile-amid-virus-lockdown.

Gatiso, Tsegaye, Isabel Ordaz-Németh, Trokon Grimes, Melandie Lormie, Clement Tweh, Hjalmar Hühl, and Jessica Junker. 2018. "The Impact of Ebola Virus Disease (EVD) Epidemic on Agricultural Production and Livelihoods in Liberia." *PLOS Neglected Tropical Diseases* 12(8): e0006580. 10.1371/journal.pntd.0006580

Grasso, Maria, and Marco Giugni. 2016. "Protest Participation and Economic Crisis: The Conditioning Role of Political Opportunities." *European Journal of Political Research* 55(4): 663–80.

Gunia, Amy. 2020. "How Coronavirus is Exposing the World's Vulnerable Food Supply Chain—And Could Leave Millions Hungry." *Time* Accessed May 8, 2020. https://time.com/5820381/coronavirus-food-shortages-hunger/.

Gurr, Tedd. 1970. *Why Men Rebel.* Princeton, NJ: Princeton University Press.

Harvey, Fiona. 2020. "Coronavirus Measures Could Cause Global Food Shortage, UN Warns." *The Guardian.* Accessed March 26, 2020. https://www.theguardian.com/global-development/2020/mar/26/coronavirus-measures-could-cause-global-food-shortage-un-warns.

Hays, J.N. 2005. *Epidemics and Pandemics: Their Impacts on Human History.* Santa Barbara, CA: ABC-CLIO.

Hendrix, Cullen, and Stephen Haggard. 2015. "Global Food Prices, Regime Type and Urban Unrest in the Developing World." *Journal of Peace Research* 52(2): 143–57.

Hendrix, Cullen, and Idean Salehyan. 2012. "Climate Change, Rainfall, and Social Conflict in Africa." *Journal of Peace Research* 49(35): 31–50.

Hillhorst, Dorothea, and Rodrigo Mena. 2021. "When COVID-19 Meets Conflict: Politics of the Pandemic Response in Fragile and Conflict-Affected States." *Disasters* 45(S1): S174–194.

Huber, Caroline, Lyn Finelli, and Warren Stevens. 2018. "The Economic and Social Burned of the 2014 Ebola Outbreak in West Africa." *The Journal of Infectious Diseases* 218: S698–704.

Ide, Tobias. 2021. "COVID-19 and Armed Conflict." *World Development* 140: 105355.

Imai, Kosuke, In Song Kim, and Erik Wang. 2020. "Matching Methods for Causal Inference with Time-Series Cross-Sectional Data." *Working Paper.* https://imai.fas.harvard.edu/research/files/tscs.pdf.

Inman, Phillip. 2020. "UK Economy Likely to Suffer Worst COVID-19 Damage, Says OECD." *The Guardian.* Accessed June 2020. https://www.theguardian.com/business/2020/jun/10/uk-economy-likely-to-suffer-worst-COVID-19-damage-says-oecd.

Jenkins, Craig. 1983. "Resource Mobilization Theory and the Study of Social Movements." *Annual Review of Sociology* 9(1): 527–53.

Jennings, Wesley G., and Nicholas M Perez. 2020. "The Immediate Impact of COVID-19 on Law Enforcement in the United States." *American Journal of Criminal Justice* 45(4): 690–701.

Jones, Benjamin, Eleanora Mattiacci, and Bear Braumoeller. 2017. "Food Scarcity and State Vulnerability: Unpacking the Link Between Climate Variability and Violent Unrest." *Journal of Peace Research* 54(3): 335–50.

Kawalerowicz, Juta, and Michael Biggs. 2015. "Anarchy in the UK: Economic Deprivation, Social Disorganization, and Political Grievances in the London Riot of 2011." *Social Forces* 94(2): 673–98.

Khanna, Sumit. 2020. "Migrant Workers Throw Stones at Police in India in Protest Against Lockdown." *Reuters.* Accessed May 9, 2020. https://www.reuters.com/article/us-health-coronavirus-india/migrant-workers-throw-stones-at-police-in-india-in-protest-against-lockdown-idUSKBN22L0JZ.

King, G., and R Nielsen. 2019. "Why Propensity Scores Should Not Be Used for Matching." *Political Analysis* 27(4): 435–54.

Kodish, Stephen R., Frank Bio, Rachel Oemcke, James Conteh, Jean Beauliere, Solade Pyne-Bailey, Fabian Rohner, Ismael Ngnie-Teta, Mohammad Jalloh, and James Wirth. 2019. "A Qualitative Study to Understand How Ebola Virus Disease Affected Nutrition in Sierra Leone." *PLOS Neglected Tropical Diseases* 13(9): e0007645. 10.1371/journal.pntd.0007645

Koehnlein, Britt, and Ore Koren. 2022. "COVID-19, State Capacity, and Political Violence by Non-State Actors." *Journal of Peace Research* 59(1): 90–104.

Langford, Ian H., Graham Behntham, and Anne-Lise McDonald. 1998. "Multi-Level Modelling of Geographically Aggregated Health Data: A Case Study on Malignant Melanoma Mortality and UV Exposure in the European Community." *Statistics in Medicine* 17(1): 41–57.

Laufs, Julian, and Zoha Waseem. 2020. "Policing in Pandemics: A Systematic Review and Best Practices for Police Response to COVID-19." *International Journal of Disaster Risk Reduction* 51: 101812.

Lichbach, Mark. 1987. "Deterrence or Escalation? The Puzzle of Aggregate Studies of Repression and Dissent." *Journal of Conflict Resolution* 31(2):266–97.

McAdam, Douglas, Sydney Tarrow, and Charles Tilly. 2004. *Dynamics of Contention.* Cambridge: Cambridge University of Press.

McNeil, Donald. 2014. "Using a Tactic Unseen in a Century, Countries Cordon Off Ebola-Racked Areas." *New York Times* Accessed August 12, 2014. https://www.nytimes.com/2014/08/13/science/using-a-tactic-unseen-in-a-century-countries-cordon-off-ebola-racked-areas.html.

Mason, T. David. 1984. "Individual Participation in Collective Racial Violence: A Rational Choice Synthesis." *American Political Science Review* 78(4): 1040–56.

Mazjoub, Aya. 2020. "Lebanon's Protests are Far from Over." *Human Rights Watch.* Accessed April 27, 2020. https://www.hrw.org/news/2020/04/27/lebanons-protests-are-far-over.

Meyer, David. 2004. "Protest and Political Opportunities." *Annual Review of Sociology* 30(1): 125–45.

Mounzer, Lina. 2020. "In Lebanon: A Pandemic of Hunger." *New York Times,* Accessed May 6, 2020. https://www.nytimes.com/2020/05/06/opinion/lebanon-protests-coronavirus.html.

Mueller, Lisa. 2013. "Democratic Revolutionaries or Pocketbook Protesters? The Roots of the 2009–2010 Uprisings in Niger." *African Affairs* 112(448): 398–420.

Mutikani, Lucia. 2020. "Coronavirus Deals US Economy Great Depression-Like Job Losses, High Unemployment." *Reuters.* Accessed 8 May 2020.

Neumeyer, Eric, Katharina Gabriela Pfaff, and Thomas Plümper. 2023. "Protest against COVID-19 Containment Policies in European Countries." *Journal of Peace Research.* 10.1177/00223433221135335

Nuyen, Suzanne. 2020. "100 Graves Dug and Copacabana Beach to Protest Brazil's COVID-19 Response." *National Public Radio.* Accessed June 12, 2020. https://www.npr.org/sections/coronavirus-live-updates/2020/06/12/875531094/100-graves-dug-at-copacabana-beach-to-protest-brazils-COVID-19-response.

NPR. 2014. "Riots Erupt over Ebola Quarantine in Liberia." *National Public Radio.* Accessed August 20, 2014. https://www.npr.org/sections/goatsandsoda/2014/08/20/341884494/photographing-an-ebola-riot-put-your-fear-aside-and-go-forward.

Nordås, Ragnhild, and Nils Petter Gleditsch. 2007. "Climate Change and Conflict." *Political Geography* 26(6): 627–38.

Oberschall, Anthony. 1978. "Theories of Social Conflict." *Annual Review of Sociology* 4(1): 291–315.

Olzak, Susan, and Suzanne Shanahan. 1996. "Deprivation and Race Riots: An Extension of Spilerman's Analysis." *Social Forces* 74(3): 931–61.

Opp, Karl-Dieter, and Wolfgang Roehl. 1990. "Repression, Micro-mobilization and Political Protest." *Social Forces* 69(2): 521–47.

Peterson, Susan. 2002. "Epidemic Disease and National Security." *Security Studies* 12(2): 43–81.

Piot, Peter. 2015. *AIDS: Between Science and Politics.* New York, NY: Columbia University Press.

Plümper, Thomas, Eric Neumayer, and Katharina Gabriela Pfaff. 2021. "The Strategy of Protest against COVID-19 Containment Policies in Germany." *Social Science Quarterly* 102(5): 2236–50.

Porta, M., ed. 2014. *A Dictionary of Epidemiology,* 6th edition. Oxford: Oxford University Press.

Price, Smith. 2008. *Contagion and Chaos: Disease, Ecology and Security in the Age of Globalization,* Cambridge, MA: MIT Press.

Quiroz Flores, Alejandro, and Alastair Smith. 2013. "Leader Survival and Natural Disasters." *British Journal of Political Science* 43(4): 821–43.

Raleigh, Clionadh. 2010. "Political Marginalization, Climate Change, and Conflict in African Sahel State." *International Studies Review* 12(1): 69–86.

Rasler, Karen. 1996. "Concessions, Repression and Political Protest in the Iranian Revolution." *American Sociological Review* 61(1): 132–52.

Ritter, Emil, and Courtenay Conrad. 2016. "Preventing and Responding to Dissent: The Observational Challenges of Explaining Strategic Repression." *American Political Science Review* 110(1): 85–99.

Sahadeo, Jeff. 2005. "Epidemic and Empire: Ethnicity, Class, and 'Civilization' in the 1892 Tashkent Cholera Riot." *Slavic Review* 64(1): 117–39.

Salehyan, Idean, Cullen S Hendrix, Jesse Hamner, Christina Case, Christopher Linebarger, Emily Stull, and Jennifer Williams. 2012. "Social Conflict in Africa: A New Database." *International Interactions* 38(4): 503–11. Version 3.3.

Sly, Liz. 2020. "Stirrings of Unrest Around the World Could Portend Turmoil as Economies Collapse." *The Washington Post.* Accessed April 19, 2020. https://www.washingtonpost.com/world/coronavirus-protests-lebanon-india-iraq/2020/04/19/1581dde4-7e5f-11ea-84c2-0792d8591911_story.html.

Snowden, Frank. 2020. *Epidemics and Society: From the Black Death to the Present.* New Haven, CT: Yale University Press.

Sperber, Amanda. 2020. "They Have Killed More of Us Than Corona: Kenyans Protest Against Police Brutality." *The Guardian.* Accessed June 9, 2020. https://www.theguardian.com/global-development/2020/jun/09/they-have-killed-us-more-than-corona-kenyans-protest-against-police-brutality.

Strong, Philip. 1990. "Epidemic Psychology: A Model." *Sociology of Health and Illness* 12(3):249–59.

Suarez, R., and B Bradford. 1993. "The Economic Impact of the Cholera Epidemic in Peru: An Application of the Cost of Illness Methodology." Office of Health, Bureau for Research and Development, Water and Sanitation for Health (WASH) Project. Field Report. 415.

Sundberg, Ralph, and Erik Melander. 2013. "Introducing the UCDP Georeferenced Event Dataset." *Journal of Peace Research* 50(4): 523–32. Version 19.1.

Sutton, P., C. Elvidge, and T Ghosh. 2007. "Estimation of Gross Domestic Product at Sub-National Scales Using Nighttime Satellite Imagery." *International Journal of Ecological Economics and Statistics* 8(SO7): 5–21.

UNAIDS. 2020. "People Living with HIV—Number of People Living with HIV—Population—All ages." https://aidsinfo.unaids.org/.

US Air Force Weather Agency. n.d."Version 4 DMSP-OLS Nighttime Lights Time Series." https://ngdc.noaa.gov/eog/dmsp/downloadV4composites.html.

Vogt, Manuel, Nils-Christian Bormann, Seraina Rüegger, Lars-Erik Cederman, Philipp Hunziker, and Luc Girardin. 2015. "Integrating Data on Ethnicity, Geography, and Conflict: The Ethnic Power Relations Data Set Family." *Journal of Conflict Resolution* 59(7): 1327–42.

Walker, Shaun. 2020. "Violence at Belgrade Protest over Government's Handling of Lockdown." *Guardian.* Accessed July 8, 2020. https://www.theguardian.com/world/2020/jul/08/violence-at-belgrade-protest-over-renewed-lockdown-measures-serbia.

Wilkinson, Steven. 2009. "Riots." *Annual Review of Political Science* 12(1): 329–43.

Wood, Reed M., and Thorin M Wright. 2016. "Responding to Catastrophe: Repression Dynamics Following Rapid-Onset Natural Disasters." *Journal of Conflict Resolution* 60(8): 1446–72.

Wood, Reed M., Gina Yannitell Reinhardt, Babak RezaeeDaryakenari, and Leah C Windsor. 2022. "Resisting Lockdown: The Influence of COVID-19 Restrictions on Social Unrest." *International Studies Quarterly* 66(2): sqac015.

World Bank. 2021. "World Development Indicators." https://datacatalog.worldbank.org/dataset/world-development-indicators.