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Political Prescriptions: Three Pandemic Stories

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Abstract

In this article, we symmetrically explore the political underpinnings and connections of pharmaceutical drugs during the COVID-19 pandemic. We illustrate some different and shifting dynamics of expert-lay interplay, competing knowledge claims in politically charged environments, as well as actions and actors that can bring drugs to prominence. Focusing on three drugs, ivermectin, remdesivir, and Coronil, we offer three axes on which they can be apprehended within political logics: (a) ivermectin as a "populist drug" in the United States, (b) remdesivir as an "establishment drug" in the United States, and (c) Coronil as a "nationalist drug" in India. These three pharmaceuticals were politicized, and perhaps more surprising, politics became pharmaceuticalized. Trust in these treatments was intimately related to articulations of the threats posed by the pandemic and the best ways of addressing them, both manipulated politically by relatively powerful actors.

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Introduction: The Polymorphous Politics of Pharmaceuticals

Pharmaceuticals often have clear political valences. Whether it is AIDS denialism connected to suspicion of antiretroviral treatments in post-apartheid South Africa (Nattrass 2007), the promotion of racially specific medication for heart failure in the United States (Pollock 2012), the assertion of pharmaceutical sovereignty through generic drugs in Mexico (Hayden 2007), or the subversion of legislation through increased access to abortion pills in Argentina (McReynolds-Pérez 2017), pharmaceuticals can connect populations, possibilities, and the polity.

The COVID-19 pandemic has drawn attention to the political underpinnings of some popular treatments, in a colloquial sense of "political," involving or associated with governments, political parties, and ideological movements and actors. The promotion of hydroxychloroquine (a malaria treatment that attracted attention in France, the United States, South America, and elsewhere), for instance, has been variously described as the outcome of medical populist performances by far-right leaders and alt-science preachers (Casarões and Magalhães 2021), a result of the calculated use of social media and "institutionalized ignorance" to create a "patriotic science" (Fonseca, Ribeiro, and Nascimento 2022, 2) and intertwined with activist efforts around the "shaping and validation of new medical knowledge and practices" (Berlivet and Löwy 2020, 527).

Lasco and Curato's (2019) pre-pandemic framing of "medical populism" as "politicising, simplifying, and spectacularising complex public health issues" is valuable for understanding the peculiarities of crisis governance (p. 1). Medical populism explains how mainstream, credentialed experts might be bypassed in favor of a combination of heterodox authorities and nonmedical opinion leaders. This framing has proven useful for mapping how individual political actors opportunistically responded to the COVID-19 pandemic (Lasco 2020; also Casarões and Magalhães 2021). In the extreme, populism becomes "pharmaceutical messianism": certain drugs are acclaimed as "miracle cures" by crafting "an imagined antagonism between ordinary, 'unscientific' lay people and the 'academic elite' of critical health experts" (Lasco and Yu 2022: 2). Such accounts are familiar tropes in science and

technology studies (STS) and are relevant to understanding the politics inherent in legitimating structures of expertise (see Jasanoff 2017) as well as in ascribing authority, credibility, and moral superiority to competing knowledge claims (see Epstein 1996; Irwin and Michael 2003).

We add to these analytics by exploring symmetrically—along planes of symmetry defined by mainstream medicine's recommendations and two oppositions to it—the diverse manifestations of political prescriptions during this pandemic. We look at the journeys of three drugs that started as COVID-19 treatments early in 2020 and continued to thrive through 2021: ivermectin, remdesivir (Veklury), and Coronil. The political logics that brought these drugs to prominence were driven by influential actors offering quick fixes by "pharmaceuticalizing" the public health crisis and by publics receptive to particular configurations of the crisis and responses to it. The pharmaceuticalization literature (e.g., Biehl 2007; Abraham 2010; Bell and Figert 2012) has shown how drugs are positioned as meaningful instruments for addressing specific issues: not only lifestyle and interpersonal problems and untreated medical conditions but also public health, financial and regulatory challenges and opportunities, and more (Sismondo forthcoming). We adopt this broader synthetic version of the concept.

Public health crises are, almost by definition, simultaneously social, political, and health crises. During the COVID-19 pandemic, various drugs were marshaled to tackle constellations of social, political, and health issues. In this article, we illustrate not just how particular drugs became politicized but also how particular politics became pharmaceuticalized.

Obviously, understandings of and knowledge about COVID-19 treatment did not exist before the pandemic, but what did precede the pandemic were particular therapeutic preferences, broad solidarities, and ideological inclinations. As the pandemic progressed, these sensibilities were actively intertwined with certain drugs to fashion certain kinds of politics. We explain the popularity and acceptance of three such drugs through politics that arise in diverse sociopolitical contexts, with distinct cultural resonances in transcontinental sites.

In the next section, we apply and adapt Lasco and Yu's (2022) idea of "pharmaceutical messianism" to make the case for ivermectin as a "populist drug," focusing on the United States. In direct contrast to this case, we argue that remdesivir emerged as an "establishment drug," endorsed by mainstream media, national health and regulatory bodies, as well as influential figures within elite biomedicine who shunned ivermectin and were shunned by supporters of ivermectin. Finally, we detail the journey of an alternative medicine from India, Coronil, which has the attributes of both a populist drug and an establishment drug and ultimately endures as a "nationalist

drug." Coronil was launched at the interface of a discourse of cultural identity and national pride on one hand and, on the other, an acute awareness among the people of the failings of their healthcare system. Together, these drugs illustrate the dynamics of expert–lay interplay, public trust, and countervailing claims of epistemic corruption—claims that systems of knowledge had become untrustworthy—in politically charged environments. They also illustrate how interest in and debates around particular drugs can be politics by other means.

We chose these three drugs because they are clear and prominent examples of differently and competitively politicized prescriptions in the first two years of the COVID-19 pandemic. Although medical and political contexts were always shifting, with respect to our narratives, there were continuities through those years. The three cases allow us to engage the political heuristics of a variety of treatment conventions, from orthodox biomedicine to traditional medications. In each case, we show how political leaders and other key actors exploited the uncertainty and desperation of the pandemic to emerge as harbingers of hope and, importantly, as winners of public trust. In doing so, they leveraged preexisting sensibilities and reentrenched them through politics. We might have chosen hydroxychloroquine instead of ivermectin as our example of a populist drug, but there is already some relevant research on hydroxychloroquine (see above), and its most successful period was before our other cases. We might have chosen one or more later antivirals such as nirmatrelvir (Paxlovid) and molnupiravir (Lagevrio), but as of our writing they were less prominent, and by the time they were available the intense pressure of the pandemic had subsided, affecting their political positions. And we might have chosen any of a number of different traditional medicines, but chose Coronil for its success in a major pharmaceutical market (Sharma 2020).

The research for this article draws on a variety of sources. We did a number of narrowly targeted keyword searches of journalistic reporting and followed leads as relevant. For each of the three drugs, we conducted mappings of clinical studies relying on ScienceDirect, PubMed, and Cochrane Reviews where applicable. We looked at press releases and official statements of the institutional actors involved in this assemblage. And we selectively sampled social media platforms such as Twitter and Facebook.

A Populist Drug: Ivermectin in the United States

On June 26, 2021, US journalist Matt Taibbi, who focuses on media and US culture wars, published an article with the title "Ivermectin: Can a Drug

Be 'Right-wing'?" (Taibbi 2021). He treated the question as a rhetorical one, and the idea that drugs can be right- or left-wing as absurd. Assimilating the issue into broader US culture wars, Taibbi argued that ivermectin had become a right-wing drug because of informal censorship about it in the mainstream media and some explicit censorship on social media. He was at some pains to acknowledge that ivermectin was an unproven treatment for COVID-19, though he recited enough evidence to be able to insist that ivermectin should be the subject of real debate and that patients should be allowed to choose to take the drug. For critics of the drug, ivermectin had received considerable attention, given the negative clinical evidence.

At that point, ivermectin was on its way to becoming a "populist drug" in the United States. Authoritarian populist elements of the right in the United States (and other countries such as Brazil and the Philippines) had adopted ivermectin and given it a political character as a way of responding to the coronavirus pandemic. The drug had become defined by a battle between populists and anti-populists, one of the most important right–left divides in current US politics.

We use the term "populist" in a broad sense, avoiding definitional debates about the term in political theory. We do, though, find ourselves using the broad notion of populism advanced by political scientist Cas Mudde (2004): an ideology that divides society between the "pure people" and the "corrupt elite," and where "politics should be an expression of the *volonté générale* (general will)" (p. 543). The composition of these categories can vary dramatically from one populist movement to another, and for this reason populism is a "thin" ideology (p. 544). It is fluid and can adhere to diverse agendas depending on the exigencies of the political moment (Mudde and Kaltwasser 2018).

Ivermectin is a drug commonly used against parasitic worms, in humans and their animal companions, as well as livestock. It is widely available in relatively inexpensive generic forms. The drug works by interfering with specific aspects of the nerve and muscle cells of helminths and insects and can do so at dosages that are not toxic in mammals.

Ivermectin's origins as a treatment for COVID-19 can be traced to a few studies done in March and April of 2020. There was evidence (Caly et al. 2020) of the drug's *in vitro* effectiveness against the coronavirus, building on previous evidence of its broader *in vitro* antiviral activity. The new work also included a quickly retracted study (Patel et al. 2020) drawing on a global database that included data on critically ill COVID-19 patients, some of whom had received ivermectin. The initial study was never formally published, likely because of early criticisms suggesting that the presented

data were impossible (Chaccour 2020). Two of the most promising early clinical studies of ivermectin (Carvallo, Hirsch, and Farinella 2020; Elgazzar et al. 2020) were later suspected of including fraudulent or manipulated data—including data from a hospital that claims not to have participated in the trial (Lee and Bensinger 2021).

Yet in the first half of 2020, thin and shaky data were enough to get ivermectin started. COVID-19 was quickly becoming a devastating disease in much of South America. Perhaps because of the drug's availability, the early signals in the data led to quick government action in some countries experiencing a massive first wave of infection. For example, in May 2020, Peru included ivermectin in its COVID-19 treatment guidelines, and Bolivia started distributing the drug for preventative use—even as the Minister of Health stated that there was no scientific evidence to support the move. Other countries followed similar paths (Robins-Early 2021). Brazil included ivermectin in its "COVID-19 kits," which were initially nominal but soon became material collections of pills sold across the country. One small city, Itajaí, provided ivermectin to all residents (Brueck 2021). In many places without production facilities, there were shortages of ivermectin formulated for human use, so people turned to formulations for livestock.

Certainly in Brazil, and possibly elsewhere, ivermectin began to carry political connotations described by Lasco and Yu (2022) as pharmaceutical messianism. For them, pharmaceutical messianism: (1) materializes in times of crisis, (2) capitalizes on existing knowledge, (3) draws on existing, though possibly heterodox, medical authority, and (4) involves accessible products. It is also often endorsed by populist political figures.

Strong endorsement by Brazilian President Jair Bolsonaro (who downplayed COVID-19 and later refused to be vaccinated for it) established a relationship between ivermectin and authoritarian populists (Álvares 2021). We note that a year later, the official government stance on ivermectin turned, and Brazil no longer supported its use. On some reporting, by late 2021, most Brazilians had soured on ivermectin, deciding that it was ineffective (Brueck 2021) and perhaps coincidentally had also soured on Bolsonaro's administration.

Ivermectin's promise took months to move to North America. It made its biggest entrance with a December 2020 submission to the US Senate, invited by Trumpist Republican Senator Ron Johnson, in which Dr. Pierre Kory claimed that ivermectin was a "miracle drug" against COVID-19. Kory was speaking on behalf of the "Front-Line COVID–19 Critical Care Alliance," (FLCCC) an organization that had developed a COVID-19

treatment protocol that included ivermectin (Homeland Security Committee Meeting 2020).

Kory's Senate testimony appears to have triggered a sharp increase in prescriptions of the drug, though the increase was not fully maintained (Fauber and Johnson 2021). On the grounds that it was promoting misinformation, video of the testimony was later deleted by YouTube, which sparked claims about conspiracies to hide ivermectin's effectiveness.

By the middle of 2021, when ivermectin became a populist drug in the United States, there had accumulated a significant amount of anecdotal and retrospective evidence both for and against its effectiveness (Turkia 2021). There was also a much smaller amount of equivocal data from randomized controlled trials (RCTs). A Cochrane Review published in July of 2021 looked at fourteen completed RCTs that compared ivermectin to no treatment, standard of care, or placebo (Popp et al. 2021). The review concluded that it was uncertain whether ivermectin reduces or increases mortality, need for ventilation or supplemental oxygen, adverse events, duration of hospitalization, viral clearance, or symptoms. The authors also noted that a significant amount of evidence available at that time was of low or very low quality. Three other reviews published at roughly the same time found modest improvements in some outcomes of patients on ivermectin versus various alternatives; the published reviews also noted the low quality of the available evidence (Cruciani et al. 2021; Hill et al. 2021; Zein et al. 2021). Indeed, these reviews were affected by the fraudulent studies mentioned above; one was first published in January 2021 (Hill et al. 2021), but that first version was retracted in light of the suspected fraudulent data. In the reanalysis, the review found no significant effect on survival or time to recovery, though it did find borderline evidence of ivermectin's reduction of hospitalization. The evidence was weak enough that already by March 2021 the World Health Organization had recommended that the drug not be used except in a clinical trial (WHO 2022).

Another key member of the FLCCC, Dr. Paul Merik, wrote one paper reviewing ivermectin studies that included references to some of the discredited early papers well after concerns about them had been raised (Offord 2021). Merik was also the lead author of a paper submitted to *Frontiers in Pharmacology* that was not accepted because of "a series of strong, unsupported claims based on studies with insufficient statistical significance, and at times, without the use of control groups" (Offord 2021).

In June 2021, the FLCCC's Kory was a guest on the extremely popular podcast the *Joe Rogan Experience*, again promoting ivermectin treatment. The Rogan podcast episode increased prescriptions of ivermectin six-fold in the United States. Taibbi's article on ivermectin, with which we began this

section, also referred to that podcast; Taibbi must have had some advance access to it, because it hadn't yet been aired at that point.

On July 9, 2021, another prominent podcaster, Bret Weinstein, appeared on the hugely popular and polarizing right-wing Fox show *Tucker Carlson Today*, arguing that "if ivermectin is what those of us who have looked at the evidence think it is . . . then the debate about the vaccines would be over by definition, because the vaccines that we have so far were granted emergency use authorization" (Creitz 2021)—a kind of authorization given when there are no known effective treatments. Weinstein's primary concerns appeared to be about the possible dangers of MRNA COVID-19 vaccines and linked the suppression of ivermectin to a conspiracy to promote the vaccines. He was effectively describing "epistemic corruption" of the Food and Drug Administration (FDA) and medical science by the pharmaceutical industry (Sismondo 2021). Weinstein, it should be said, describes himself as a left-libertarian but is best known for stances that cohere well with US right-wing populism.

"America's Frontline Doctors" (AFLD) started promoting ivermectin sometime in 2021. Led by Dr. Simone Gold, AFLD is an organization created by the conservative Council for National Policy and supported by the pro-Trump Tea Party Patriots (Bergengruen 2021). Her political leanings are apparent from her criminal record: Gold was charged and found guilty as a result of her presence in the crowd that stormed and invaded the US Capitol on January 6, 2021. The AFLD organization was initially created in 2020 to support President Trump's reelection campaign by marshaling medical voices agreeing with his and other Republican policies and distracting from his failures at handling the pandemic. AFLD had taken stances against lockdowns, in favor of hydroxychloroquine as a COVID-19 treatment and against COVID-19 vaccines. A "miracle drug" had obvious attractions for people and institutions opposed to COVID-19-related restrictions; if COVID-19 can be minimized as a risk, less needs to be done about it. Since it joined the ivermectin bandwagon, AFLD had also been earning a considerable amount of money by offering consultations that led to ivermectin prescriptions, mailed from a connected pharmacy. Interviewed about this practice, Dr. Siyab Panhwar, a physician at the University of Tulane, commented: "The anti-vax movement as a whole is one big multi-level marketing scheme" (Bergengruen 2021).

In addition, ivermectin's availability made it attractive. Although prescriptions of the drug may have been difficult to get due to medical skepticism or to fill due to shortages of formulations and dosages for humans, in

the United States, it remained available in veterinary formulations. This led to its castigation as "horse paste" by some opponents and journalists (Weill and Rawnsley 2021). Perhaps the fact that some people could take matters into their own hands by procuring ivermectin—in the face of mainstream medicine's apparent inability to control COVID-19—helped to make it a "populist" drug. Using a common substance to combat a scourge allows populists to thumb their noses at medical elites, especially given the failure of those elites to control the problem and the fact that they often appear to be part of a broader untrustworthy liberal coalition that is undermining closely held values.

In ways familiar to readers of controversy studies in STS (see Collins and Pinch 1998; Martin 1991; Richards 1991), ivermectin lives on. Promoters and critics find ways to support and promote the studies with which they agree and to challenge or ignore the studies with which they don't agree. In principle, a controversy can persist as long as there are willing participants, and the one around ivermectin shows every sign of persisting. There has emerged a cottage industry developing evidence for ivermectin's effectiveness, questioning negative studies, and documenting the epistemic corruption of medicine that suppresses the drug. Evidence and arguments circulate through social and similar media, as well as mainstream medical literature. In this literature, hundreds of studies and reviews have been published (more than hundred in the first half of 2022 alone), with most concluding that ivermectin has very little to no effectiveness, and continuing to note the low quality of many of the positive studies. Here, we step back from those details, because our focus is on the broad political positions that sustain sides on the issue.

We can see ivermectin in the United States as neatly satisfying the requirements of a miracle pharmaceutical agent in Lasco and Yu's (2022) characterization of pharmaceutical messianism. It is an accessible and affordable substance, its safety was established by a long history of use as a treatment for parasites, and its effectiveness was vouched for by medical authorities, albeit heterodox authorities. As in the cases discussed by Lasco and Yu, ivermectin was promoted by a number of relatively powerful political actors. Taibbi, who turns out to have been one of those actors, was right that ivermectin for COVID-19 was shunned by the mainstream media and mainstream medical experts and that as a consequence it was censored by social media. But he missed the fact that by the time he was writing, right-wing figures had already adopted the drug as their own. They had made ivermectin a right-wing drug and had made support for it into a way of engaging in populist right-wing politics.

An Establishment Drug: Remdesivir in the United States

STS researchers have extensively explored terrains of expert–lay interplay, mapping boundaries of expert and lay knowledges (Collins and Evans 2002; Epstein 1996; Wynne 1996). We have already seen a rejection of mainstream expertise by people who rejected establishment medicine's pronouncements on COVID-19. In this section, we focus on remdesivir by examining the staging (Hilgartner 2000) of expert endorsement that combined its manufacturer's strategic efforts with expressions of official support to give remdesivir the status of an establishment drug. We argue that this was part of the process through which remdesivir became a contrastive case to ivermectin, acquiring a deeply political character.

Remdesivir, an antiviral owned by the pharmaceutical company Gilead, was initially though unsuccessfully tested as a drug for hepatitis C in the late 2000s. A few years later, in a large screening program for drugs for Ebola and Marburg virus disease, the US Centers for Disease Control (CDC) and the US Army Medical Research Institute identified remdesivir as a possible treatment and did key preclinical and clinical research on it (Ardizzone 2020). Although it also turned out to be a poor drug for Ebola, trials provided evidence that it wasn't terribly toxic. There were also good theoretical reasons, supported by laboratory evidence, to believe that it would be active against a range of viruses, including coronaviruses.

The story of remdesivir as a COVID-19 treatment begins with a single case (Joseph 2020). In late January 2020, the first person in the United States diagnosed with COVID-19 was suffering from a worsening condition. After a consultation with the CDC, he was given the experimental drug intravenously, and within a day his symptoms improved. The single case propelled optimism. Less than a month later, a trial of remdesivir began, sponsored by the US National Institute of Allergy and Infectious Diseases (NIAID). In reporting on February 26, the drug was called "promising" (Parsons 2020). By mid-March, with still no data in hand, the medical news venue *STAT News* gushed:

> With governments and scientists scrambling to come up with a treatment for COVID-19, there's one contender that's way out in front. Called remdesivir and made by Gilead Sciences, it has a long history in industry, government, and academic labs and has inhibited other coronaviruses in preclinical studies. (Joseph 2020)

Quoted in the same report, Bruce Aylward of the World Health Organization had earlier commented: "There's only one drug right now that we think may have real efficacy, and that's remdesivir." Shortly thereafter, the drug's manufacturer, Gilead, announced that there was an "overwhelming demand" for remdesivir on a compassionate use basis, and the company would no longer be providing it to patients (Herper 2020a).

Gilead's summary of outcomes for sixty-one patients who had received the drug on a compassionate-use basis was published in the *New England Journal of Medicine* on April 10 and presented optimistically: 68 percent of patients saw clinical improvement (Grein et al. 2020). By the end of April 2020, there were preliminary results from another Gilead trial with 397 patients. The company was still taking no chances with direct comparisons to placebos or other treatments. This trial had only two arms, one in which hospitalized patients were given remdesivir for five days, and one in which they were given the drug for ten days, with discharge from hospital within fourteen days being the primary endpoint. Interestingly, a higher percentage (64.5) of the first group than the second (53.8) were discharged within two weeks. One of the lead investigators, Aruna Subramanian, gave this a strange positive spin: "These data are encouraging as they indicate that patients who received a shorter, 5-day course of remdesivir experienced similar clinical improvement as patients who received a 10-day treatment course" (Lovelace 2020).

The partial results of two more trials became available at the same time. A small double-blind placebo-controlled RCT in China did not show a statistically significant difference between remdesivir and placebo for time to clinical improvement (Wang et al. 2020). It did show a significant number of adverse events in the drug arm of the trial, and for this reason was ended early. Preliminary results of the NIAID trial showed a four-day difference between remdesivir and placebo in time to recovery, later increased to a five-day difference, but no statistically significant difference in deaths. It was later revealed that the primary outcome had changed substantially during the trial—from clinical status on day 15 to time-to-recovery by day 29 (Beigel et al. 2020). Notable in the face of this ambiguous data was a public statement by White House Chief Medical Advisor Anthony Fauci, who was then one of the lead members of the White House Coronavirus Task Force, about the NIAID trial: it was "quite good news" (Lovelace 2020), with a "clear-cut positive effect in diminishing time to recovery," showing "that a drug can block this virus." Moreover, Fauci maintained, "this will be the standard of care" (Dreisbach et al. 2020). The US government appeared to be throwing its weight behind a drug whose development it had supported.

With his apparent smirks behind Trump during presidential briefings, and his direct contradiction of the President on many issues, including on hydroxychloroquine as a COVID-19 treatment and specific measures to combat the virus, Fauci was fast becoming a divisive political figure in the United States. He was immensely respected by most Democrat voters and traditional elites and was castigated and lampooned by populists. By mid-2020, Fauci was the subject of an administration whisper campaign to discredit him (Scott 2020). Probably more than anybody else, Fauci came to embody establishment medicine in the United States through this period.

On May 1, 2020, the US FDA issued Emergency Use Authorization for the use of remdesivir for patients with severe cases of COVID-19. At this time, newspaper and other reports started attaching to remdesivir the phrase "the only drug," as in "the only drug shown to work in COVID-19 patients" (Kolata 2020) or "the only drug cleared to treat COVID-19" (Herper 2020b). The NIAID trial was being deemed a success both for authorization and public perceptions. The frequency with which remdesivir was referred to as "the only drug . . . " may reflect one element of a successful marketing campaign by Gilead, or it may reflect convergence among researchers, health officials and journalists borne out of demand for a legitimized treatment. Remdesivir was on its way to becoming an "establishment" drug: it was approved by recognized government regulators, credentialed and supported by mainstream medical experts, promoted and sold by a major pharmaceutical company, and accepted by patients who trusted many of those authorities.

Gilead further improved its public relations by committing to donate almost 1 million doses of remdesivir to US hospitals—enough to treat roughly 150,000 patients (Boodman 2020). At that early point in the pandemic, though significant, that number was not enough to ensure that every hospitalized patient would be treated, especially given that there was no plan for distribution of the donated doses. The simultaneous availability and scarcity reinforced the drug's position as a successful COVID-19 treatment.

Already in March 2020, the World Health Organization (WHO) had begun a large five-arm RCT, the "Solidarity trial," of repurposed drugs for COVID-19. It included remdesivir, as well as hydroxychloroquine (an antimalarial drug), lopinavir (an antiretroviral medication) with or without interferon (an antiviral drug and immune system trigger), and local standards of care. The results were available on October 15, 2020. The Solidarity trial failed to show that any of the treatments, including remdesivir, were effective at treating COVID-19. Though Gilead had seen the results before they were generally available, the negative data did not

prevent the company from selling US$1 billion of the drug to the EU on October 8 (Cohen and Kupferschmidt 2020). Also, the data did not prevent the FDA from granting the company full market (and not just emergency) authorization on October 22. A contributor to the Solidarity trial, the statistician Richard Peto, complained that "Gilead and the FDA have sort of maneuvered us into a position where we're being asked to try and prove remdesivir does nothing rather than asking the usual way round, which is, 'Can the manufacturers prove it does something?'" (Cohen and Kupferschmidt 2020). Despite the weak evidence behind it, the drug's place in mainstream medicine's formulary had been solidified.

By mid-2021, almost a year later, the case for remdesivir had not improved. A Cochrane review of RCTs that looked at the effects of the drug on the mortality of hospitalized COVID-19 patients found that it "probably has little to no effect on all-cause mortality" (Ansems et al. 2021). Nonetheless, sales in the United States were and continue to be reasonably strong; after a slow start in 2020, they topped forecasts, and worldwide they reached roughly US$6 billion on an annualized basis (Langreth 2021).

Social media, and Twitter in particular, show a twinning of remdesivir and ivermectin in the United States. Numerous tweets in the second half of 2021 variously claim that ivermectin is a safe and effective treatment for COVID-19, that remdesivir is ineffective and has multiple side effects, yet hospitals routinely administer remdesivir for COVID-19 patients and deny those patients ivermectin—mainstream medicine is portrayed as an enemy of the people, corrupted by the pharmaceutical industry. Figure 1 is a typical example published by a Twitter user with the tagline "Stop complying with Tyranny," replying to a request for prayers for somebody who had been hospitalized. Many shared stories of deaths after administration of intravenous remdesivir, or presented comparative accounts, facts about the huge price differences between the two drugs or concrete evidence of corruption by the pharmaceutical industry. A smaller, but still significant number of tweets point to the official endorsements of remdesivir and disparage ivermectin as quackery promoted by the gullible.

Responding to the demand for ivermectin and the rejection of remdesivir in the United States, state legislatures controlled by Republicans, including New Hampshire, Tennessee, Ohio, and Kansas, passed laws protecting the prescription of ivermectin (and hydroxychloroquine) for COVID-19. States controlled by Democrats, such as Virginia, have blocked such legislation. In total, thirty state legislatures have seen laws proposed to protect doctors who prescribe unapproved COVID-19 treatments (Smith 2022). We can see politics reflecting the *volonté générale*.

Figure 1. Tweet supporting ivermectin over remdesivir.

If in the United States ivermectin is a populist drug, then remdesivir is an establishment one. This is not just because remdesivir failed to become a populist drug, but because its establishment connections gave it a political character. Remdesivir was developed and repurposed by a large pharmaceutical company, Gilead, with extensive contributions by US government agencies and labs (Cleary 2020). It is produced by that company, with a price tag of US$3,000 per course of treatment (covered by US insurers, including Medicare and Medicaid). It was endorsed by the FDA, as well as by the NIAID, the CDC and other agencies. It was promoted through public statements by one of establishment medicine's authority figures in the United States (Anthony Fauci) and by many other mainstream physicians. The result is that the drug found a solid place in mainstream medicine's formulary.

A Nationalist Drug: Coronil in India

While biomedical science was struggling with the evolving disease and pandemic, traditional therapeutic interventions and locally derived medicinal substances to treat COVID-19 gained traction in various parts of the world. Preventive and healing practices drawing on native and long-standing cultural traditions surfaced in China (Ochs and Garran, 2021), Tibet (Tidwell and Gyamtso 2021), Korea (Flowers 2021), regions of Africa (see WHO Africa 2020), and India, which is our case study here. We analyze Coronil, emerging from the traditional knowledge system of Ayurveda, which falls within the ambit of various medical systems

recognized by the Indian government. Coronil represents a unique combination of populist appeal and establishment support, couched within an explicit nationalist rhetoric of reinstating native cultural pride. The trajectory of this drug allows us to explore a politicized prescription outside the frame of modern biomedicine, but whose success runs parallel to ivermectin and remdesivir—all three were responses to fill a dreaded treatment vacuum in the pandemic, all driven by relatively powerful actors.

In April 2020, the Indian Ministry of Ayurveda, Yoga & Naturopathy, Unani, Siddha, Sowa-Rigpa, and Homeopathy (Ayush) issued Ayurveda-based immunity boosting self-care guidelines for protection against COVID-19. This was one among many research and development initiatives and public health advisories advanced by this ministry (Kotecha 2021), which is charged with research and propagation of traditional systems of health care in India (Ministry of Ayush 2020). While most of these ministerial measures were directed at general well-being, preventive steps, and management of asymptomatic and mild COVID-19 cases, one company was attempting to push past this mandate as well as the limitations of biomedical efforts in the treatment of COVID-19.

Patanjali Ayurved Ltd. is an omnipresent brand in India and a multibillion-dollar corporation, co-founded and popularized by Baba Ramdev—a Yoga guru and an ardent advocate of the resurrection of the traditional Indian knowledge system of Ayurveda. Established in 2006, Patanjali Ayurved is today one of the leading consumer goods companies in India, comprising food manufacturing units, hospitals, a pharmaceutical company, a research institute, a university, and several other institutions and enterprises. Ramdev's popularity and his extensive public campaigns have raised the company into the limelight, yet the company's ascent also can be attributed to a shift in consumers' views in India, where preference for local goods over "foreign" products is deemed ethically desirable, weaved into the discourse of economic self-reliance that was an integral part of the anti-colonial movement (Khalikova 2020).

Ramdev's voiced nostalgia for ancient India's glory aligns with the rhetoric of the ruling party in India, which he actively endorsed in the 2014 national elections, widely regarded as a landmark juncture in Indian politics. This rhetoric invokes the supremacy of a distinctly Hindu cultural identity and weaves it with nationalism and the pursuit of a "homegrown" economy (Khalikova 2017; Tripathy 2019). There is a clear resonance of mythic reverence, moral superiority, and nationalistic passion in the words of Ramdev and the ruling party, which underpin political and cultural ties between them (Crair 2018; Worth 2018).

In late June 2020, Patanjali Ayurved launched a drug named "Coronil" at its headquarters in Uttarakhand, a state in Northern India considered one of the holiest lands for Hindus. In the press conference at this launch, Ramdev claimed that Coronil was the first clinically tested, evidence-based Ayurvedic medicine to have shown 100 percent favorable results during clinical trials on COVID-19 patients (*India Today* 2020). The Coronil tablet was part of a "Coronil Kit" that included another tablet and an oil, which was developed jointly by the Patanjali Research Institute, Haridwar, and the privately owned National Institute of Medical Science (NIMS), Jaipur. It was priced at 545 rupees, relatively affordable when compared to the prices of other COVID-19 drugs in India at that time, and sold at Patanjali pharmacies, Patanjali stores, as well as via the company's website and various online retailers.

A few hours after the launch of Coronil, the Ministry of Ayush issued a statement saying it did not have any knowledge of the "facts of the claim and details of the stated scientific study" mentioned by Patanjali Ayurved (PIB Delhi 2020). It asked the firm to provide details of the research study on the basis of which Patanjali had launched the medicine for treatment of COVID-19 and to further "stop advertising/publicizing such claims till the issue is duly examined." Furthermore, the Ministry requested the State Licensing Authority of Uttarakhand, where the product was launched, to furnish license and product approval documentation issued to Patanjali Ayurved.

In response, the company's managing director, Dr. Acharya Balkrishna, tweeted that all information related to the placebo-controlled RCTs undertaken for Coronil had been submitted to the Ministry, and that the "communication gap" had been addressed (2020). Ramdev insisted that Patanjali Ayurved was not promoting the drug based on false claims, and reiterated that their study had established recovery in 100 percent of patients enrolled in the clinical trial (*Scroll.in* 2020).

Meanwhile, the Uttarakhand Department of Ayush clarified that it had granted Patanjali Ayurved permission to manufacture drugs as immunity boosters against cough and fever. The License Officer stated that the application submitted by the company did not mention treatment of Coronavirus and therefore the department would be issuing the firm a notice under the Drugs and Cosmetics Act, which prohibits "misleading advertisements and exaggerated claims of drugs and medicinal substances including AYUSH medicines" (PIB Delhi 2019).

A week after it had launched Coronil as the first "evidence-based" cure for the highly infectious disease, Patanjali Ayurved denied having

commercially sold or publicized any formulation as the treatment for COVID-19 (Makkar 2020). Instead, it insisted the company had only shared the successful results of the clinical trials with the media. The Union Ministry of Ayush, having assessed this matter, allowed Patanjali Ayurved to sell Coronil and the two accompanying drugs launched with it as immunity boosters. The Ministry cautioned the company not to make any claims about curing COVID-19 in the packaging and marketing of these drugs. It also declared that the clinical trials initiated by Patanjali for potential Ayurvedic treatment of COVID-19 accorded with government guidelines. Continuing its rhetorical yoga, Patanjali Ayurved issued a press release stating that the Ministry had admitted that the firm had done an appropriate job of COVID-19 management. It further reiterated the success of its medicines in the trial on mild to moderately ill patients.

This entire exchange was framed by Patanjali as simply a matter of communication and wording. At no point did the Ministry of Ayush interrogate the robustness of the study conducted, the details of which Balkrishna claimed to have provided to them. Instead, according to Patanjali, their efforts were actually lauded by the ministry (*The Hindu* 2020). When the study was published seven months later, in February 2021, it could be seen that Patanjali's assertions were based on a single small trial conducted at the National Institute of Medical Sciences and Research, Jaipur, and not multiple trials at various sites as initially declared. In February 2021, Ramdev claimed at a press conference that more than 10 million people had consumed Coronil (*Mint* 2021).

The "pilot" clinical trial on which Patanjali based claims about the efficacy of Coronil was conducted with hundred asymptomatic participants, including eighteen women, and only four participants over the age of fifty-five (the group most at risk of COVID-19; Devpura et al. 2021). In short, the trial was small and highly unrepresentative. In addition, five participants, apparently all in the treatment group, did not complete the trial; the publication did not include any intent-to-treat analysis, which would have nearly erased the difference between Coronil-administered and placebo patients. There were also some inconsistencies, including between dates of enrolment and the stated length of the trial (Mukunth 2020). Balkrishna, one of the coauthors of the study and holding nearly full ownership of Patanjali Ayurved Ltd, failed to disclose his conflict of interest as the managing director of the company.

On February 18, 2021, Ramdev led a Patanjali press event to highlight this research paper, announcing that its Research Institute had successfully established Coronil as the first evidence-based medicine for COVID-19

(*Patanjali Dairy* 2021). At the event, where the Union Health Minister Harsh Vardhan was present, Ramdev claimed that the research paper would remove all misgivings about Coronil, which he claimed had been granted the Certificate of Pharmaceutical Product (CoPP) licensed by the Drugs Controller General of India, in accordance with the World Health Organization's Good Manufacturing Practices (*Scroll.in* 2021). Ramdev said that armed with the scientific validation it needed, the drug could be exported to 158 countries.

The presence of the Health Minister at Patanjali Ayurved's event, actively endorsing a commercial pharmaceutical drug, added to the list of mutual favors between the ruling party and Patanjali Ayurved (Bhatia and Lasseter 2017). While Coronil was launched on the strength of Ramdev's populist appeal, his confidence in the repeated assertions of its success came with some backing from the government.

The Indian Medical Association—a voluntary organization of physicians in India—issued a scathing press release criticizing the union health minister for promoting an "unscientific product" like Coronil, relating his presence at the Patanjali event to the central government's endorsement of the drug (Indian Medical Association 2021). In the wake of this letter, Patanjali issued an apparent "fact-checking" response, asserting, among other things, that "Coronil is an evidence-based medicine with the integration of scientifically validated research evidence under pre-clinical and clinical expertise" (Balkrishna 2021).

Even as Patanjali Ayurved ventured to legitimize Coronil's credentials through the norms and benchmarks of mainstream medicine, in a public appearance in May 2021, Ramdev courted controversy by calling the same medical tradition a "stupid" and "bankrupt" science. Denouncing drugs like hydroxychloroquine, fabiflu, ivermectin, and remdesivir, he claimed that more people had died due to the consumption of allopathic medicines than due to lack of hospitalization or shortage of medical oxygen (Kumar 2021). Faced with backlash from the medical fraternity and the prospect of lawsuits, Ramdev later withdrew his statements.

The question of reviewing the claims made by Patanjali Ayurved was raised in the Lower House of the Indian Parliament, Lok Sabha. One of the queries was "whether the Government endorses claims by the manufacturers of Coronil tablets that it is a remedy for COVID-19" (Government of India 2021a). In response, the Minister of State for the Ministry of Ayush informed the House that an Interdisciplinary Technical Review Committee (ITRC) constituted by the Ministry assessed the core ingredients of Coronil and suggested that it could be used as a "supporting measure" in COVID-19

treatment. It was subsequently confirmed in another answer to a Lok Sabha question in July 2021 that after a review of the study, the State Licensing Authority of Uttarakhand had granted license for the Coronil tablet to be "used as supporting measure in the management of COVID-19 without claiming cure" (2021b). Clearly, ITRC and the Ministry were unconcerned by the limitations of the study but instead found a middle ground by recommending the drug be used for COVID-19 management—without clarifying what "management" implied.

The attribution of "supporting measure" to Coronil by state-appointed experts effectively served as a rhetorical solution to what was framed by Patanjali as a mere "communication gap" (Balkrishna 2020). Moreover, the failure of the ITRC to critically evaluate the trial on which its efficacy was being marketed eventually delegated the verdict about Coronil's effectiveness to the public. This turn of events proved favorable for Patanjali, especially in the extraordinary circumstances of uncertainty engendered by the pandemic. As mentioned earlier, there is in India a level of trust in Ayurvedic products that is tied to a sense of cultural identity and pride and is mediated through the vocabulary of nationalism. This is further infused with a desire to boost "Indian-ness" and support Indian goods, driven by a resentment toward foreign goods and companies, which are seen as neocolonial villains (Worth 2018). Together, all these factors have led to the wide acceptance of Coronil, notwithstanding the misleading data presentation and the dubious study through which the company advertised this drug as a "Tested & Verified medicine" (as mentioned on its packaging).

The story of Coronil, in which Patanjali Auyrved pressed into service the claims of heterodox authority and simultaneously presented "the public with an accessible, affordable, and/or readily available cure" (Lasco and Yu 2022, 3) evinces the same populist traits of ivermectin in the United States. Yet, given the reluctance of the Ayush Ministry and of the ITRC to appropriately examine the robustness of the study on which Coronil was touted as an "evidence-based cure," Coronil tacitly became a kind of establishment drug. Challenging it would have been tantamount to disputing widespread trust in the strength of Ayurveda. As a result, while Coronil was floated by a powerful populist figure, its presence within the fragile sphere of India's public health was tacitly backed by the state and widely accepted by the public with a historical legacy of trust in traditional knowledge systems. And as such, while Patanjali Ayurved attempted the ironic compromise between extolling the drug's virtues within the framework of indigeneity and validating its effectiveness through protocols embedded in "Western" medicine, Coronil became a "nationalist drug" and passed the test in public discourse.

Conclusion

Pandemics are like fires, shifting patterns of presence and absence (Shrum et al. 2020, building on Law and Singleton 2005). And like fires, pandemics may menace even where and when they are locally absent. As mostly invisible dangers, they are significant threats to social and political orders to be met with new ways of shoring up old orders or creating new ones (Douglas [1966] 2003). It is no surprise, then, that in pandemics, pharmaceuticals become politicized and politics become pharmaceuticalized.

We have described three political configurations of COVID-19 pharmaceuticals. Animated by the desire to contain the uncertainty and chaos of the pandemic and to appear as harbingers of hope, in each of these instances influential actors manipulated selective, often problematic, scientific evidence to offer a silver bullet in a public health crisis. Simultaneously, specific publics adopted or formed themselves around these treatments. And given the anemic scientific evidence underlying the promise of these treatments, their endorsement—and interim acceptance—should be understood within political heuristics.

Medicine, whether "alternative," "traditional," or "mainstream," carries cultural meaning (see Lupton 2012). Promoters of different kinds of medicines develop and exploit different narratives for the recovery or maintenance of states of wellness, wholeness, and balance when advertising their products. These can be enormously successful and combine well with widespread hopes and demand for drugs to address health and other problems (Dumit 2012; Sismondo 2018). Normally, "alternative" medicine is understood as part of a binary with "mainstream" allopathic medicine or biomedicine, and "traditional" medicine is part of a similar binary. Ivermectin and Coronil both do and do not participate in these binaries. Clearly, advocates of the two drugs position them in opposition to mainstream medicine. However, support for both ivermectin and Coronil draws on the authority of mainstream medicine, albeit in different ways: ivermectin because the drug is part of the formulary of mainstream biomedicine, though not for COVID-19, and Coronil because Patanjali attempted to gain legitimacy for it through much publicized clinical trials. Such ambiguities or hybridizations do not make either ivermectin or Coronil particularly unusual; many instances of nonmainstream medicine similarly cross binaries (Gale 2014). Our cases are notable, though, for how they connect to broad political choices in diverse contexts.

In the case of ivermectin, populist leaders and movements adopted the unproven homespun drug and assimilated it into political stances around the

power and virtues of ordinary folk. They engaged in political action by defending ivermectin and aggressively rejecting other options—pharmaceuticalizing politics. We might be tempted to see this as a peculiar and pathological phenomenon, steered by the specifics of populism and driven by the pressing concerns of the pandemic. Such a temptation would be reminiscent of the kind of asymmetric approach against which early works in STS reacted, in which analysts explain what look like clear mistakes in terms of contingent actions and forces from outside science (Barnes and Bloor 1982; Bloor [1976] 1991)—we are here making assumptions about you, gentle readers of *Science, Technology, & Human Values*. We presented a case that has one plane of symmetry with the ivermectin case: an unproven high-tech drug linked to establishment politics, remdesivir. Again, leaders and publics engaged in political action by defending remdesivir and ridiculing other options. And then, to illustrate a counterpart that merged elements of the first two cases, we introduced another plane and another case: an unproven traditional drug linked to nationalist politics, Coronil. The typology is not a complete one: different political formations may each have their pharmaceutical formations.

At the center of the competition and controversy between the ivermectin and remdesivir camps are dueling claims of "epistemic corruption" (Sismondo 2021). Populists repeatedly argued that the pharmaceutical industry had corrupted federal agencies and medical science, rejecting readily available treatments like ivermectin to sell its high-priced drugs and high-tech vaccines. The establishment repeatedly argued that circulating half-truths and untruths on social media had corrupted public discourse, resulting in the common rejection of medical expertise. And Ramdev joined the fray: even as he claimed that Coronil had been vetted through high-quality clinical trials, he rejected allopathic medicine as "bankrupt," on the strength of nationalist sentiments underlying traditional medicine.

The political character acquired by each of these drugs was shaped by their different sociopolitical settings and not necessarily by just the specificities of the drugs. In other words, the manner in which the public health crisis was pharmaceuticalized across various sites was not determined by the actual drug, but by the constellation of economic milieu, political will, and health realities within which the drug materialized. For instance, it is not that remdesivir, a high-tech expensive drug produced by a large pharmaceutical company and approved by a key regulator, had to become an establishment drug. We can see that in the drug's initially similar but eventually divergent path in India. In June 2020, a month after remdesivir was granted emergency use authorization by the US FDA, the drug regulator in India also granted emergency use

permission for its administration in hospital or institutional settings. The Clinical Management Protocol released by India's Directorate General of Health Services in June 2020 took a cautious approach for prescribing remdesivir (MoHFW 2020). The drug continued to be an ambivalent part of Indian treatment guidelines after its efficacy became contentious with the release of WHO's Solidarity Trial's findings in October 2020 (Mudur 2020). As the COVID-19 caseload in India declined toward the end of 2020, remdesivir's demand diminished, and by February 2021, its production in India was negligible, which subsequently affected its supply in April, during India's devastating second wave. As the cases surged dramatically and hospitalizations soared, families of patients clamored to get the drug and created a black market (Chandna 2021). In June 2021, the Indian government issued an advisory for the "rational use" of remdesivir, repeatedly underlining the need to use it only in exceptional circumstances (Joint Monitoring Group 2021). Through none of this did remdesivir become an establishment drug in India. Instead, the government and the medical establishment were mostly cautious, though a combination of desperation and practical pressures kept sales strong.

This snippet illustrates that the unfolding of each of the three drugs discussed here, including the same drug in two different countries, also depended on where publics chose to place their trust—at least provisionally for the purposes of treatment—under extraordinary circumstances. It was a combination of this need to try something in the face of the pandemic and actions of influential operatives that contributed to the political stature of these drugs.

Given the widespread pharmaceuticalization of medicine, not to mention of everyday life, the COVID-19 crisis easily created demand for drugs to address the problem. This is because pandemics—along with medical threats more generally—abhor a treatment vacuum. In many different places, within a few months of its arrival, the COVID-19 pandemic had sparked new and widely accepted treatments. How people reacted to those treatments was intimately related to different factions' articulations of the threats and the best ways of addressing them. These contingencies became active sites for political play and posturing. COVID-19 drugs, as a result, became so linked to identities and identifications that support for one or another drug became a way of doing politics.

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