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RESEARCH ARTICLES

Disease X and Africa

How a Scientific Metaphor Entered Popular Imaginaries of the Online Public During the COVID-19 Pandemic

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Abstract

In 2018, the World Health Organization (WHO) announced the addition of Disease X, a hypothetical infectious threat, to its blueprint list of priority diseases. In the construction of discourse that circulated following this announcement, conceptions of Disease X intersected with representations of Africa. In our article, we share a broad strokes analysis of internet narratives about Disease X and Africa in the six months before the onset of the COVID-19 pandemic (July–December 2019) and during its first six months (January–June 2020). Our analysis focuses on how the scientific concept of Disease X was applied by 'non-experts' to make meaning from risk, uncertainty, and response. These non-experts drew in parallel upon more general representations of power, fear, and danger. This research is particularly relevant at the time of writing, as online narratives about COVID-19 vaccination are shaping vaccine anxiety throughout the world by drawing upon similar conceptions of agency and inequality. Because Disease X in Africa still looms as a perceived future threat, considering the narratives presented in this paper can provide insight into how people create meaning when faced with a scientific concept, a global health crisis, and the idea that there are other crises yet to come.

Keywords

Disease X, COVID-19, Pandemics, Imaginary, Health communication.

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Introduction

In an article published in October 2021, Tedros Adhanom Ghebreyesus, Director-General of the World Health Organization (WHO), and his co-authors argue that 'COVID-19 will not be the last Disease X' (Van Kerkhove, Ryan, and Ghebreyesus 2021). When COVID-19 was declared a Public Health Emergency of International Concern (PHEIC) by the WHO in January 2020, its appearance was not unexpected. The idea that emerging threats were coming had already been established in international policy and vocabulary. In March 2018, the WHO had added the metaphorical 'Disease X' to the agency's list of priority infectious diseases that were determined to 'pose the greatest public health risk due to their epidemic potential' (WHO n.d.). Unlike the other eight diseases on the list, Disease X was not an existing pathogen; it was a placeholder for a potential threat that *might* cause an epidemic or even a pandemic.

We argue that conceptions of Disease X intersect with representations of Africa in discourse that is circulated online. We share a broad strokes analysis of internet narratives about Disease X and Africa in the six months before the onset of the COVID-19 pandemic (July–December 2019) and during its first six months (January–June 2020). Our analysis focuses on how the scientific concept of Disease X was applied by 'non-experts' to make meaning from risk, uncertainty, and response. These non-experts drew in parallel upon more general representations of power, fear, and danger. This research is particularly relevant at the time of writing, as online narratives about COVID-19 vaccination are shaping vaccine anxiety throughout the world through similar representations as well as by drawing upon conceptions of agency and inequality.

The strategy of 'anticipatory imagination' is integral to global health preparedness for experts and non-experts alike as we strive to build resilience to future epidemic threats based on previous experiences (Lakoff 2017). The world has already faced, for example, H1N1 in 2009, Middle East respiratory syndrome (MERS) in 2012, the West African Ebola outbreak in 2014–2016, and Zika in 2015–2017. Interpretations of these previous epidemics by the media and in popular culture cast these incidents as 'a cipher of the perpetually emergent pandemic that is just around the corner' (Caduff 2015, 21).

Imaginaries of Africa

Inspired by medical historian Christos Lynteris, we use the term 'imaginaries' here to reflect upon the 'way[s] in which pandemic-borne human extinction refashions our understanding of humanity and its place in the world' (2020, i). Preparations for an upcoming pandemic, including public health simulations, global health communication, and preparedness exercises, produce imaginaries that are

embedded in other frameworks of understanding which they can amplify and transform (Keck and Lachenal 2019; Lynteris 2016). Before and during an epidemic, multiple imaginaries are circulated, amplified, and challenged in different ways and by different social actors.

The ‘out of Africa’ imaginary of infectious disease threats and the pathologisation of poverty shape representations of the origins of disease and disease risk on the continent. Imaginaries of Africa feed the global imagination, shaping visions from within and outside. When it comes to representations of infectious disease by those living on the continent, indigenous cultural models of illness are often mediated and reinterpreted through an external, so-called expert, non-African lens that is provided by actors in global health; however, these processes are under-explored (Mudimbe 1988). What imaginaries come to the fore in depictions of Disease X, and how do imaginaries of Disease X and Africa shape one another?

Imaginaries surrounding assumptions of African unpreparedness for an emerging pandemic are shaped by the tools used by global health actors. Such tools rarely produce a nuanced or complete picture of readiness and resilience. For example, the Global Health Security Index report of October 2019 showed most African countries as being the least prepared in the world for a future pandemic. It has been pointed out, however, that this index was predictive ‘almost exactly in the opposite direction’ in terms of preparedness for COVID-19 (Aitken et al. 2020). With a profound irony, the United States, the country that at the time of writing has had the most deaths globally from COVID-19, was determined by this report to be the most prepared to face a public health emergency (Cameron, Nuzzo, and Bell 2019).

Global health preparedness and response on the African continent have been critiqued for centring on strategies to convince local populations of the priority problems, and for their conviction that transnational global health tools and external experts hold the solutions to these problems. Such solutions may or may not overlap with the perceived needs and strategies of those who live in these areas (Escobar 2011; Mbembe 2001). These types of development narratives remain salient in global health work, although they have been challenged by many scholars, particularly those situated within postcolonial studies (see for instance Mbembe 2001; Escobar 2011) or critiques of cultural imperialism (Mudimbe 1988). However, even during the current COVID-19 pandemic, considerations of a future pandemic that behaves more like the one predicted (ravaging ‘poor’ and ‘unprepared’ places), continue to inform narratives and ideas around ‘coloniality’ (the ongoing process of colonialism) in the Global South (Gamlin et al. 2021).

The construction of an imaginary of a continent as being deficient and under-prepared also feeds into an imaginary of other places (usually those in the Global

North) as being powerful and having agency. Although the African continent had far fewer deaths per capita in 2020 due to COVID-19 than other places in the world, this resilience does not seem to have become as visible in the global imaginary as its continued perceived lack of 'preparedness' (MacGregor et al. 2022; Johns Hopkins Coronavirus Resource Center 2021).

Creating risk and meaning through the management of uncertainty

During times of uncertainty, meaning is created from information and evidence through calling upon shared representations and imaginaries. In Paul Farmer's early work on the emergence of social narratives around HIV in Haiti, for example, he describes how these imaginaries eventually became integrated into everyday discourse about misfortune related to imperialism, poverty, and jealousy. Biomedical narratives disseminated via radio, posters, or as slogans on t-shirts may have shaped 'the contours of a cultural model of AIDS' in Haiti, but these were much less important in interpreting this new illness than were pre-existing meaning structures and relationships (Farmer 1990, 22).

Disease X, like COVID-19 that quickly followed, is a symbol of the uncertainty that our world is facing (Leach et al. 2021). The management of uncertainty in scientific knowledge has led to diifferent ways of assessing and predicting risk which has had real-world policy effects (Stirling and Scoones 2009; Waldman, Gadzekpo, and MacGregor 2015). In his seminal work on risk perception, Peter Sandman differentiates between 'hazard' (what actually causes harm according to empirical data) and 'outrage' (what people fear may harm them). He posits that scientific experts usually calculate risk solely through assessing hazard factors; ordinary people do so through outrage factors, coupled with how familiar they are with these (Sandman 1987).

Imagining risk within uncertain contexts can challenge the policies, understandings, and meanings of scientific certainty. The growing role of scenario-building, the dominance of a 'worst case' logic, as well as 'unpredictability, instability [and] uncertainty', are 'at the heart of a new way of thinking fed by constant exchanges between reality and fiction' (Zylberman 2013, 215 [our translation]). 'Pandemic prophecy' and 'scientifically inspired visions of the future' have become key to infectious disease research and how meaning is created from public health information about future risks (Caduff 2014, 296).

Social media and the internet provide a space for the interpretation of information. Global health agencies, national and international press, and 'non-expert', everyday citizens all use social media as a way of disseminating information. However, the channels of social media and the internet are also used as ways of gathering information, challenging dominant narratives, and creating new

discourse. The world has entered a new period of ‘medical populism’, made possible through rapid access to large amounts of specialised scientific information by non-experts (Lasco and Curato 2019). Recent vaccine hesitancy, for example, has been fed by internet users who create meaning within a context of uncertainty. Tensions between ‘scientific assessments of risk and public perceptions of risk’ are amplified in the online setting (Larson 2020, 45). Considering the real-world implications of online narratives during a time of ‘medical populism’ highlights how these narratives are informed by broader imaginaries and in turn feed into people’s perceptions and ‘explanatory models’ that shape a variety of health behaviours, including those related to vaccines (Lasco and Larson 2019).

In her work on vaccine hesitancy, Larson borrows the World Economic Forum’s term ‘digital wildfires’ to describe the conversational havoc that can occur in our hyper-connected world. This fuels ‘undue panic in public health, driving behaviours that can accelerate rather than mitigate the spread of infectious diseases’ (Larson 2020, 69). She posits that at the heart of vaccine hesitancy is a lack of full trust in biomedicine, and the privileging of ‘anecdote-as-evidence’ over scientific studies (Ibid., 1). Social reactions to unfamiliar infectious diseases can certainly be seen through a lens shaped by a collective imagination that is fed by popular fiction (novels and movies) as well as by scientific fiction in the shape of scenarios and models (Keck 2015).

Examining online narratives

The study which forms the basis of this article was conducted online and was intended to provide an overview of discourse around Disease X and Africa. The characteristics of the study population—those who shared or wrote posts published on Twitter, blogs, forums, and online news sites—were often difficult to identify. While all individuals involved in the creation and circulation of this online discourse were able to write in English and had internet access, most results were not geo-localised, and this prevented us from identifying who had crafted these posts and from where the posts had been shared.

While admittedly the lack of detail about the creators of internet narratives and the narrow inclusion of a specific type of internet user are limitations of this study, we, the authors of this article, feel that the results nonetheless provide an important glimpse into how the concept of Disease X was mobilised. It is our hope that this will help to build awareness of this type of online discourse as well as act as a point of departure for future, more detailed research about how global health concepts are applied in online spaces.

Using an English language Boolean query keyword search, we collected the data that we analysed for this study through conducting internet searches and via the

media monitoring software ‘Meltwater’. This online data collection tool is used for social media listening, market research, and examining public opinion. Meltwater is one of several online media monitoring tools that make up the quickly transforming dashboard landscape of ‘netnography’ (Kozinets, Scaraboto, and Parmentier 2018). The software has also been used by medical anthropologists to explore the perceptions and experiences of healthcare workers in relation to care delivery during the COVID-19 pandemic (Vindrola-Padros et al. 2020). This method has been particularly useful as a way of ‘doing anthropology in inaccessible fields’ (Hagberg and Körling 2014).

Following the 2018 announcement by the WHO, African celebrities, scholars, political leaders and companies rapidly joined the global conversation about Disease X and Africa. While the reach of social media across the continent is densely concentrated in urban areas and varies across and within countries, Twitter is among the most visited websites in many African countries and gives us a snapshot of conversations within and about Africa from African and worldwide social media users (Essoungou 2010). For people in the diaspora, or for those with only a theoretical interest, the internet also provides connections and information, while simultaneously offering a space for discussion, contestation, and construction. Individuals from the diaspora are often perceived as having an expertise that gives them an influential role when taking part in debates carried out via the social networks of their countries of origin.

Our study was designed broadly to capture these discussions and debates. We sought to explore online narratives without specifically focusing on any specific geographic area, hashtag, or website. Data were collected through focused internet searches for posts, articles, blogs, and videos containing both the terms ‘Disease X’ and ‘Africa’, published during two time periods: July–December 2019 and January–June 2020. Other than date of publication and the requirement to include both keywords, inclusion criteria required results to be written in English. We excluded results that were from academic journals, from private restricted accounts, that had broken links, were duplicates, or were no longer available online. While we included news articles in both searches, we excluded official global health websites such as those linked to the WHO.

We did not have a target number of results and approached this collection of data in a way that drew upon our expertise conducting ethnographic research as well as systematic and scoping literature reviews, trying to capture all relevant evidence (Munn et al. 2018). The first search (of material published between July and December 2019) was intended to provide a snapshot of how the WHO’s concept was circulating online. SARS-CoV-2, the virus that causes COVID-19, was discovered as we were preparing these data for analysis. As, along with the rest

of the world, we scrambled to navigate the emerging pandemic, we decided that it was important to conduct another online search six months after the first one in order to compare the data from these two time periods.

We chose to conduct this research in English as it is the working language of the two members of the research team who conducted data collection and led the analysis, as well as being an important language in the African internet space (Probyn 2016). This decision to include only those results published in English shaped the type of posts that we analysed. We also recognise that the fact of their being written in English is likely to have implications for from where and by whom they are likely to have been written. We do not claim that the narratives that we chose for analysis were representative of those circulating among any specific population, but rather that they provide a glimpse into online discourse about the continent.

For the searches for the first time period, we used three different search engines (Google, Dogpile, and Bing) in order to identify content that contained the keywords. The first ten pages of results from each of these search engines in December 2019 identified 78 unique results, which were downloaded and saved as PDFs. A second search was conducted using Meltwater for ‘Disease X’ and ‘Africa’ on 16 June 2020 (again, covering the first of the two identified time periods) and returned 295 news site and blog results and 51 social media results. After the duplicates, inactive links, or results missing keywords were removed from this group, 66 results were saved. The combined ‘pre-COVID-19’ dataset of 144 results was uploaded to NVivo for thematic analysis.

We conducted a second Meltwater search on 1 July 2020 which produced 544 unique results (193 social media/YouTube, 144 news sites/blogs, 207 Twitter). Because we had found from the first search that the results produced by search engines and those identified by Meltwater were similar, we chose to conduct the second search only using Meltwater. After removing duplicates, results that were missing keywords, and non-English results, we downloaded 165 full text articles for thematic analysis. In the instance that a Tweet or other post was shared several times, we downloaded the first post only, in addition to any other post that appeared to have relevant comments.

A total of 309 posts and publications were included in the analysis, comprising 144 from the ‘pre-COVID-19’ period and 165 from the ‘during COVID-19’ period. While some of these results were geo-localised by country, most were not. We did not distinguish between sources within and outside Africa because of this lack of information. Although it would be interesting to explore the localisation of authors in future research, for this study we chose to concentrate on the broad narrative themes that emerged from the search results rather than the identifiers of their

authors. Many articles and Tweets seemed to have been shared widely. We also did not attempt to identify the original sources of these results.

We uploaded the full text results of our two searches to Nvivo as 309 individual PDFs. Two of the authors, Sams and Grant, read the texts and conducted inductive thematic coding. When the results included comments or images these were also coded. The first stage of coding identified key narratives derived from results taken from both time periods. These narratives were then grouped and refined. A second stage of coding was done using these refined codes. The codes were then compared between the two data sets.

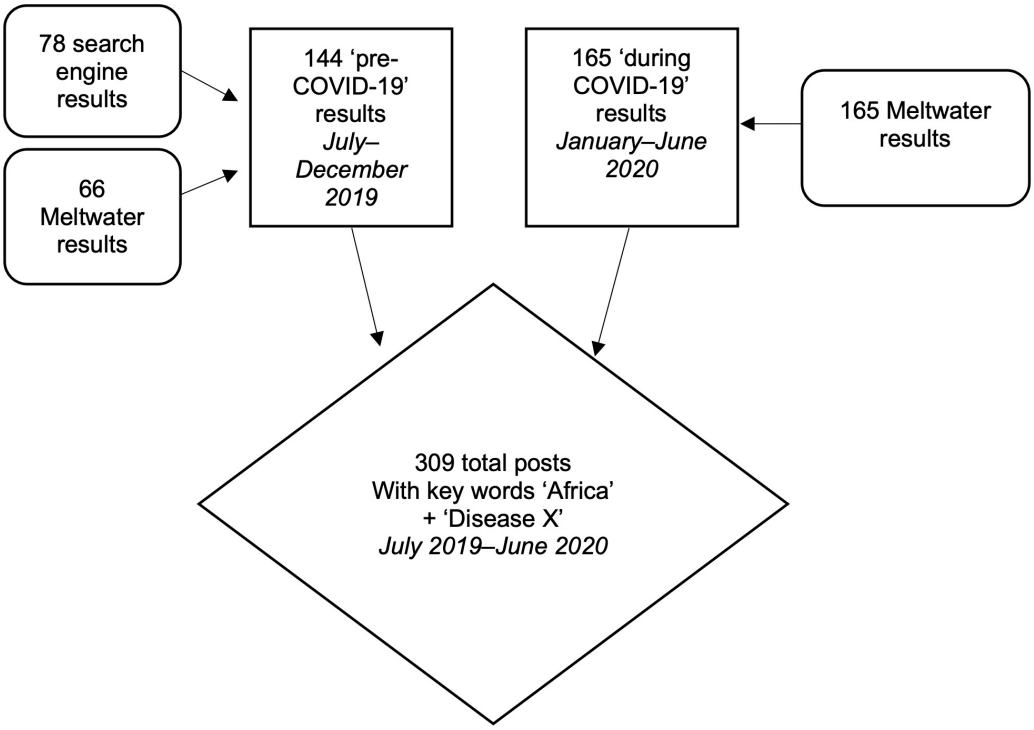

Figure 1. Data collection process. Image by the authors.

Sams then created concept maps for the narratives identified in this analysis, and these concept maps were discussed with and confirmed by Grant. Key citations for all narratives were identified, and selected citations are presented in this article as evidence of these themes and sub-themes of the combined data sets. Sub-themes were defined as those that characterised the overarching themes and could be grouped within these 'umbrella' themes. For example, in posts that contained themes of 'illness experiences', these were divided into sub-groups according to the specific illnesses that were being compared or used to reflect upon Disease X.

Transferring ethical guidelines for gathering data offline to the online space can be useful in order to consider the ethics of working in this virtual research site (Markham and Baym 2008). We chose to approach this online study as if we were conducting research in another public space, such as observing behaviours on the street. Because our data were gathered from public accounts without identifying any individuals, we did not seek to obtain informed consent. Although we considered our approach to data collection as being an unobtrusive method, we were guided by a consideration of the potential effects that could be created. We therefore sought to minimise any negative effect by removing all personal identifiers. We have used pseudonyms for the usernames of individuals whose posts are shared in this article—but have identified the online news sources that appeared in our searches. This reflects ethical decisions made by other online researchers, including those investigating more sensitive or personal topics revealed in the public internet space (Bogen et al. 2018; Hine 2015; Williams, Burnap, and Sloan 2017).

Stable narrative themes during the emergence of COVID-19

We identified seven overarching themes through inductive narrative analysis of both datasets: cause(s) of Disease X; Disease X and African destruction; illness experiences; prediction; preparedness; response; and pandemic imaginary. The datasets from the two time periods were thematically coded together, and when the overarching themes were compared between the two datasets no differences were found. While these overall themes were the same across both of the search time periods, there were key differences within the sub-themes that are explained below. We describe each of these themes and share some examples as evidence in the text that follows. For example, although much of the online discourse in 2019 centred on bats and the military as causes of Disease X, these topics became less prominent in their perceived relationship with Disease X during the second search period, when the COVID-19 pandemic had begun. Although our searches only captured results that specifically mentioned ‘Disease X’, we speculate that in the later search these perceived causes may have moved toward being connected with the emerging SARS-CoV-2 virus and away from Disease X.

Another important difference between the sub-themes of narratives from the two time periods is the mobilisation of experience with existing diseases. Although these types of narratives usually centred around Ebola in the search results from the first time period, COVID-19 became the key example of Disease X in the search conducted in July 2020. Representations of global connections emerged in narratives about COVID-19 as Disease X and coming from outside Africa, highlighting concerns about geopolitical interests. Themes emerged about the

potential cause of Disease X and these centred on Chinese drilling, the Chinese natural gas industry, circulation of people, and globalisation. China and Africa were often grouped together in narratives that appeared in 2020.

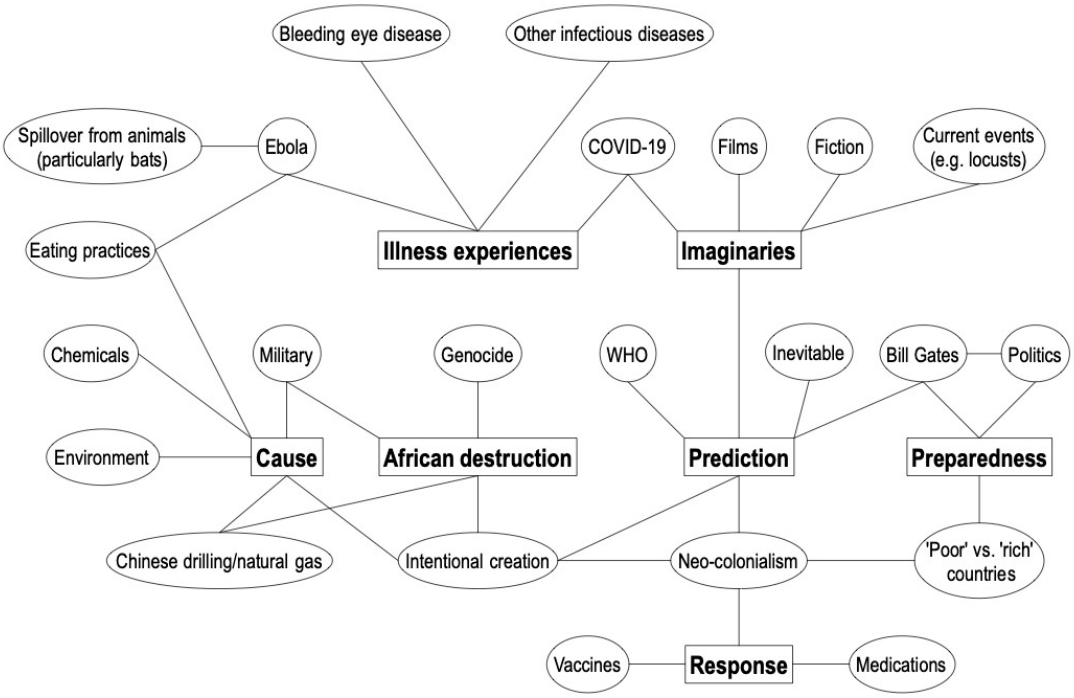

Figure 1. Narrative themes and sub-themes. Image by Nitin Jayaswal.

Cause(s) of Disease X

Narratives about the cause of a potential Disease X included a range of topics, which included zoonotic disease originating in bats, military intervention, chemicals, and Chinese drilling for/exploitation of natural gas. In the six months prior to the onset of the COVID-19 pandemic, there was more emphasis on the potential role of the military and the human role in zoonotic spillover, linked to evidence from other epidemics such as Ebola in West Africa. Bats were often identified as the probable cause of Disease X, as seen in a BBC article that, after describing Ebola epidemics in Africa, stated ‘the next pandemic will probably emerge from bats’ (Gorvett 2018). Other early narratives about the potential cause of Disease X included military intervention and, as found in several blog posts from individuals working in global health or in online news articles, the overuse of antibiotics related to ‘people’s growing dependence on antibiotics to cure illnesses in Africa’, as one blogger originating from South Africa wrote in 2019.

Bushmeat and intensive farming remained central among the identified possible causes of Disease X, both before and during the COVID-19 pandemic.

Marketplace and eating practices in Africa and China were often pointed out as leading to the emergence of this metaphorical disease. One example is a 2019 online news article described a future Disease X caused by ‘markets selling a variety of live animals and bushmeat, especially in tropical Africa and Asia’.

As SARS-CoV-2 was first being identified in China, narratives simultaneously shifted to include reflection on Chinese drilling in Africa and chemicals as potential causes of a Disease X on the continent, often using the example of an alleged ‘bleeding eye disease’. Some speculated that this was the next Disease X in Ethiopia, although this was denied by official bodies (Ali and Gardner 2020). ‘Interestingly, the origin of “Disease X” happens to be near a Chinese “natural gas” plant. Take from that what you will’, JohnSkep (located in Ethiopia) posted on Twitter in 2020 about the outbreak, accompanying it with an image of a bleeding eye. Another post on Twitter in the same year, from an unidentified location, made reference to this same outbreak, describing ‘A malady killing people in Africa – not far from where some Chinese ppl [people] are drilling for water!’

By the beginning of 2020, after COVID-19 had been identified as a health issue of international concern, some narratives centred on COVID-19 as Disease X; others questioned the inaction that had led to this outbreak—and could therefore cause a future Disease X. ‘Isn’t it scary that we knew Disease X would come from China and it would be a respiratory disease and wet markets were still allowed to proceed?’, asked a blogger originating from Nigeria. Many narratives interwove the African continent and the country of China and questioned the role that the circulation of people and goods was playing in the development of the disease. For example, Real46 tweeted: ‘Globalism is the direct cause of the Coronavirus pandemic. CDC [Centers for Disease Control and Prevention] has known for 20 years that Disease X would come from China/Africa’.

Disease X and African destruction

Discussion boards and forums about Disease X often used the WHO’s communication about the disease concept as evidence that it was being created by the same scientific bodies discussing its prevention. The following conversation on an online Africa-focused forum, with contributors drawn from around the world, shows how the metaphor of Disease X as created by the public health community was used as evidence that this same community was involved in preparing an intentional biological attack:

> Colo7: ‘Disease X’ is actually a term they’re using to describe the potential threat of a yet-unknown pathogen. It doesn’t even exist yet.
>
> JanetB: Cuz they havnt created it yet.

> CombineHart: I've come to the conclusion that they know all this information because they have the disease in a lab somewhere and when they decide to kill us all, they want to say they told us so.

Online media sources also fuelled concerns about potential nefarious intentions behind the global health community's announcement of a potential Disease X. Some YouTube videos described Disease X as being specifically developed by White scientists to kill Black people, both on the African continent and elsewhere. Comments posted in response to these videos before the COVID-19 pandemic highlight questions about the intentions behind these future predicted disease outbreaks. An example of this can be seen in the comments of one YouTube video about Disease X:

> Walter1234: Mass genocide … The question is, for who though?

> SpringChick: Being that Sub Saharan Africa's population is going to more than double in 20 years to 2.5 billion and then double again in another 20 [years] to 5 billion we have a pretty good idea of who they are going to target.

Other narratives included speculation about the geographic origin of the future disease. 'Nobody knows where Disease X, the name given to an unknown pathogen expected to cause a pandemic that will kill ~80m, will come from, but experts believe it will occur in either China or Africa. My bet's on Africa', ChadWest wrote on Twitter in 2019 from Nigeria. Another post, referring to the image of a map marking in red those areas predicted to be affected, held up this image as evidence of the disease being an intentional way of harming a specific population: 'Disease X …? Another biological weapon to be tested on Africans in Africa … no wonder the most prone areas in red is in Africa', AntiCliX posted on Twitter in 2020. Conspiracy theories around Disease X continued during the beginning of the COVID-19 pandemic as these theories transformed so as to centre on COVID-19 as representing Disease X. These were illustrated by questions ranging from those about global geopolitical interests and the potential 'creation' of the disease, to the purpose of vaccines and medications, to doubts around its very existence.

Illness experiences

Those narratives that engaged with experiences of other illnesses in order to fuel reflection broadly shifted from (in 2019) a focus on Disease X as being worse than Ebola to (in 2020) COVID-19 as being Disease X. These existing diseases were also used as examples of what Disease X could be, or to suggest that Disease X was going to be even more devastating than any previous epidemics. Some posts on social media used Ebola as a template of epidemic horror to insist upon the potential destruction that could be caused by a future Disease X. 'Ebola has a fearsome reputation, though it is a known hazard and relatively well understood.

But consider the threat from a previously unseen pathogen—a so-called “Disease X”—one that spreads easily enough to hitch a ride on an airplane to the other side of the world’, the author of an African feminist blog wrote in 2019 from Kenya.

Before COVID-19 entered international news, many publications focused on Ebola as a warning of what was to come. The author of a 2019 online news article summarised it thus: ‘The Ebola outbreak of 2014 to 2016 that devastated West Africa should have been a wakeup call to the global community [that Disease X is coming]’. Some publications questioned humanity’s ability to control a potential Disease X based on previous epidemic control measures. One blogger in 2019, referring to the ongoing outbreak in north-eastern Democratic Republic of Congo, which was on the cusp of a sixteenth month of the Ebola epidemic, reflected: ‘If we can’t stop Ebola what hope do we have of stopping Disease X?’.

The mysterious ‘bleeding eye disease’ in Ethiopia, attributed by many social media users to Chinese natural gas drilling in the area, but whose existence public health officials denied, was referenced in many online narratives in 2020. ‘Disease X hits Ethiopia. The gruesome sickness, “bleeding eye fever”, has a higher mortality rate than the plague and has mystified medical professionals for the past couple of years’, the author of an online news article wrote. Because this bleeding eye disease, seen by many to be just such a Disease X, was occurring at the same time as the world was becoming aware of COVID-19, the two were often compared or equated. For example, ChanX123 tweeted in 2020 from the United States, ‘let’s face it this is far worst then Coronavirus … but I think we rest easy. Because if you see blood in the eyes vs. someone coughing … whew good thing that is in Africa, maybe we should place a travel ban on Ethiopia’.

Simultaneously, and more markedly, publications during the first six months of the COVID-19 outbreak showed narratives about Disease X shifting from a potential future catastrophe to one that had already begun. A journalist writing for East African News in 2020 described how ‘the WHO released a list of diseases that are a high risk to the public due to their potential to spark an epidemic and the limited treatment available to combat them. In that list was an ominous “Disease X”, and a year later Covid-19 was the disease’ (Okeyo 2020). A South African blogger wrote, ‘Less than two years after the WHO blueprint was published, Disease X turned up. It began late last year in Wuhan, China, and the wider world became aware of it in January’. A 2020 Tweet that was widely shared on Twitter stated: ‘Disease X may be upon us and the first cases in vulnerable nations like Nigeria have already been reported’. ‘Is this the one we were warned about?’ PWLCJ wrote on Twitter in response to a post about Disease X becoming COVID-19 in Africa.

Although fewer in number, other narratives challenged the idea of COVID-19 as being Disease X. ‘COVID-19 is NOT “Disease X”’ the writer of a Kenyan blog posted in 2020, noting: ‘It is highly transmissible, but by infectious disease standards it is still mild. That’s not to say it’s not dangerous, but it does not alarm the public in the way a bioterrorist attack, or a highly transmissible Ebola-type virus would impact human behaviours’. Some sources claimed to have scientific knowledge about the specifics of Disease X that allowed them to distinguish it from the COVID-19 pandemic. A commenter on another blog post about COVID-19 argued: ‘While I agree that this is NOT “Disease X” being prepared is not about how bad something will be, but about how bad other people THINK it will be’.

Prediction

Narratives about the meaning of the act of prediction were similar for the two time periods of data but seemed to intensify in the latter period. Results taken from both time periods mobilised Bill Gates’s 2015 TED Talk (Gates, 2015) and the WHO’s act of adding Disease X to its 2018 Blueprint List of Priority Diseases as evidence that Disease X is (or will be) an intentionally created—rather than naturally occurring—phenomenon. ‘Bill Gates continues to “WARN” about Disease X. Drumming up publicity for his inevitable “correct” prediction?’ questioned TerrE on Twitter in 2020, writing from an unidentified location. Other international conspiracy theories and political relationships were sometimes evoked by these publications, such as by one blogger, who in a 2019 post posited: ‘In 2017 Vladimir Putin accused Bill Gates of starting the Ebola epidemic in Africa. Now he is starting Disease X’. Other narratives praised Bill Gates for noticing what governments did not want to acknowledge, suggesting that his predictions may be helpful in controlling Disease X. The author of one 2020 blog post wrote that ‘the prospect of a global pandemic was overlooked by governments, even after recent outbreaks of the Ebola virus’, going on to claim that ‘Bill Gates may be the African continent’s best hope to avoid Disease X’.

While many narratives in 2020 focused on Disease X as being COVID-19, others used the existence of COVID-19 to support a prediction of an even worse future Disease X. ‘What keeps me awake at night is what they have called Disease X—a totally new pathogen—whose biology and epidemiology would be totally unknown—or perhaps unknowable … It is not a question of whether but of when’, wrote Dr Richard Sezibera, a former secretary general of the East African Community. His April 2020 East African News article, titled ‘After COVID-19 new viruses will strike, this is the time to prepare for attacks’, was written when fewer than 10,000 cases had been confirmed in Africa (Sezibera 2020; World Health Organization 2020).

Dr Sezibera's article went on to discuss the history of pandemics and the need to ensure preparation for 'Disease X', supported by a logic that new pathogens will continue to emerge despite the distraction of COVID-19. This was illustrated by an image titled 'one doesn't fight an epidemic during an epidemic', accompanied by the image of a cheering scientist flanked by an anthropomorphic bar of soap and bottle—presumably all celebrating the end of COVID-19—while a giant shadow monster labelled 'Disease X' looms behind him unnoticed.

One blogger from the UK in 2020 posed the following rhetorical question: 'When does a conspiracy theory become a conspiracy reality?', avowing that 'COVID-19 looks like a perfectly designed "Disease X"'. A few publications pointed toward the sources of these conspiracy theories, such as an online news article from 2020 that critiqued the 'fake news' site Infowars for its article about Bill Gates as being 'indirectly responsible for both Ebola and Zika outbreaks' and 'planning a global pandemic beginning in Africa known as "Disease X"' (Broderick 2020).

Preparedness

Before and during the COVID-19 pandemic, narratives analysed preparedness for Disease X, and the specific threat of Disease X to developing countries seen as 'unprepared', such as those in Africa. Pre-COVID-19 publications tended to focus on the distinction between 'poor' and 'rich' countries in relation to preparedness, and several articles mobilised the Global Health Security Index (GHSI) created by the Johns Hopkins Center for Health Security, which showed most of the African content as being 'least prepared' to face an epidemic (Cameron, Nuzzo, and Bell 2019). A 2020 news article from the UK summarised: 'poorer nations in Africa and Asia – where new disease outbreaks are most likely to occur – have health services that are often poorly funded and close to breaking point' (McKie 2020).

An online news article from the UK-based Daily Mail Online referred to the GHSI and described how 'Most of the EU 28, including Spain, Germany, Italy, Austria and Norway, were considered "more prepared", a tier below Britain and the US. Whereas the majority of Africa was deemed the "least prepared" of all the countries due to poor immunization' (Boyd 2019). Headlines of news articles or videos that emphasised a lack of preparedness for a big epidemic threat were often quite dramatic before the COVID-19 pandemic. These included one 2019 YouTube video titled 'NO ONE IS SAFE – Disease X', and a Forbes article describing a mystery disease that 'could kill more than 30 million people in less than a year' (Lee, 2017).

A news article published on a Nigerian news website at the beginning of the COVID-19 pandemic also drew from the GHSI to reflect upon Nigeria's preparedness, observing that: 'According to the 2019 GHS Index, Nigeria is not

prepared for the next global epidemic or/and pandemics' (Muanya 2019). Narratives in early 2020 focused less on preparation for a future catastrophe and more on the potential damage that could be caused to an 'unprepared' world by COVID-19 if it ended up being the feared 'Disease X'. 'Worst of all, Africa, a continent that has not yet registered any infected, could be extremely vulnerable if the disease reaches its shores', one commenter, whose location is unknown, wrote on a forum in April 2020, as infections spread.

Disease X was sometimes explicitly equated to COVID-19 in 2020. For example, one East African global health blogger wrote that: 'World health authorities have spent a lot of time and money-making plans for dealing with the next major outbreak, but it's never enough. Nobody thought Disease X would be a coronavirus'. A meme (of unknown origin) that was tweeted and retweeted thousands of times in 2020 shows the image of a boy pasted above the country of South Sudan in a map of Africa, his eyes wide in apparent horror. The text below this image reads: 'Coronavirus cases have been confirmed in Egypt and Disease X has been found in Ethiopia. S. Sudan's healthcare sector is the worst in the world.'

Several posts used the concept of Disease X to launch a critique of government, related to COVID-19 and preparedness. 'Governments are spending more to rescue banks and oil companies than on saving lives', one Twitter user from the UK stated, adding: 'The problem isn't that prevention was impossible. It was very possible. But we didn't do it. Just wait 'til it's Disease X'. The overall message from these sources was that it was possible to have prepared for this known threat and that not enough was done to ensure countries could respond to a Disease X when it arrived. Also present was a narrative of African success, which praised learning from past epidemics and a perceived natural lifestyle. Nevertheless, this more positive reflection was intermingled with conspiracy theories.

Response

In the pre-pandemic period of investigation, narratives about response tended to focus on vaccines as being the 'most powerful tool against infectious diseases', characterising vaccines as 'the one weapon that can stop them dead in their tracks' (Hatchett 2019) and calling for the development of vaccines against Disease X even before the disease had been identified (The Economist 2019). Other pre-pandemic posts centred on medications used to treat or prevent a hypothetical Disease X—often demonstrating confusion about how a treatment or vaccine could be developed for a disease that does not yet exist—as well as frustration with the lack of transparency. One UK blogger wrote: 'Remdesivir, a broad-spectrum antiviral, was developed more than a decade ago to cure an unknown "Disease X" and is currently being trialled on patients in the NHS … it didn't work now it does?'.

Many publications, both before and during COVID-19, made reference to the Coalition for Epidemic Preparedness Innovations (CEPI), an institution that had committed to investing a large sum of money (cited variously as anywhere from $390 to $496 million) to develop 19 vaccines against ‘priority pathogens’, including Disease X. These articles tended to be written by people working in global health, such as Richard Hatchett, chief executive of CEPI, rather than by non-experts.

Some posts at the beginning of COVID-19 pandemic in 2020 were optimistic about the future, even as they equated the coronavirus with Disease X. As one US news article optimistically stated, ‘This could be the “Disease X” health experts fear – but we should have a test vaccine in just 16 weeks’. Other narratives used vaccine development as evidence to show that COVID-19 was indeed Disease X, created intentionally to boost the profits of the pharmaceutical industry. AngelaD on Twitter, for example, re-tweeted a post stating, ‘One year before the COVID-19 outbreak, Imperial College was working on a vaccine for “Disease X”’. This could be interpreted as a comment on global power structures and malign forces looking to gain commercially from induced suffering.

Before the COVID-19 pandemic, online discussion of the control measures used during the 1918–19 influenza pandemic, such as isolation, quarantine, good personal hygiene, use of disinfectants, and limitations on public gatherings were compared to those that would be needed for Disease X. During the COVID-19 pandemic, these narratives expanded to highlight the need for medical treatment and warning against a repeat of a potential neo-colonial global health response that was perceived to have happened during the West African Ebola epidemic.

Pandemic imaginaries

The pandemic imaginaries of fear and harbingers of Disease X were fed by fiction, films, and current events. While we found these imaginaries in the pre-COVID results, they became much more prominent during 2020. Current events during this time, such as the locust plague that threatened East Africa, were also woven into these concerns by some individuals. One blogger wrote: ‘It looks like the plague of locusts in Africa could soon develop into the worst in modern history, and a massive plague of bats is severely terrorizing parts of Australia. On top of all that, African Swine Fever is wiping out millions upon millions of pigs around the globe. And now they want us to think about Disease X.’

Several posts made reference to the Netflix documentary *Pandemic: How to Prevent an Outbreak*, released in January 2020, or to the 2013 film *World War Z* (WWZ). Some bloggers and social media users explicitly described the link between these films and their own health knowledge. For example, JohnNat wrote on Twitter that ‘CDC has known for 20 years where Disease X would come from

… Movie WWZ simply translated white papers on disease transmission into entertainment'. During the COVID-19 pandemic, other individuals drew on these films to support their reflections about what the world could expect next.

The author of an online news article published on 3 March 2020, less than two weeks before the COVID-19 outbreak was declared a global pandemic, referenced re-watching *World War Z*: 'The words spoken by the protagonist at the end of the movie sent chills down my spine. He said, "It's not the end, it's just the beginning. We should be prepared for everything in future". In the perspective of the current increasing risk of the "pandemic" of coronavirus, these words penetrated the fears in my subconsciousness' (Chauhdry 2020). Other individuals expressed finding comfort in real life meeting fiction while the COVID-19 pandemic raged. The writer of a blog review about the book *Disease X* by N.J. Croft wrote, 'At a time when it seems the world has been turned on its head, it is sometimes fun to read a book that encapsulates a similar pandemic feel'.

Addressing uncertainty and catalysing preparation

The findings of this research highlight several aspects of how a scientific concept can be interpreted and applied that are particularly relevant for risk communication and community engagement (RCCE) (World Health Organization 2020a). Challenges to communication and engagement by using the Disease X concept in preparedness highlight the crucial need to address trust, uncertainty, and transparency in such communication and engagement programmes. Disease X served as a metaphor for an infectious disease that was cloaked in opacity, uncertainty, and mistrust. Perceptions of risk grew independently from and alongside scientific evidence, catalysed by diverse health information sources. Without addressing these factors, scientific evidence can become overshadowed by social and political forces that shape broader interpretations and reactions. RCCE programmes that seek to mobilise against future epidemics should remain aware of how conceptions of risk are balanced with ideas about destruction and strength, especially when it comes to imaginaries of the Global South.

When the WHO added Disease X to its list of priority diseases its aim was to mobilise global health preparedness efforts to plan for and support the quick identification of and efficient response to an upcoming emerging infectious threat. However, the precision of the predictions that surrounded this metaphor seemed to fuel conspiracy theories and fears which mobilised ongoing narratives and imaginaries about Africans as being simultaneously victims and cause of future epidemic destruction.

The concept of Disease X and the need for preparedness were already set in international policy and vocabulary when COVID-19 was identified at the beginning

of 2020. Imaginaries about Africa were dominated by disease, death, and medico-technical global interventions—even if an African 'resilience' has also emerged. We seem to again be facing the 'dead end' earlier identified by Mbembe (2001): an oscillation between instrumentalist and reductionist perspectives. This juxtaposition between an Africa of ingenuity and one of despair does not fully consider the multifaceted forces and agency in the authorship of these stories.

Predictions, conspiracy theories, and their effects

The detail of the prediction of an upcoming pandemic made by Bill Gates in his 2015 TED talk was mobilised widely in online discourse that followed the WHO's creation of the concept of Disease X. The focus of the Gates Foundation, the WHO, and other global health actors on vaccine development helped fuel representations of a man-made disease that was an excuse to sell vaccines that further spread the disease and/or caused other negative effects such as population control. These representations echoed and built upon previous narratives, for example those that circulated in response to the West African Ebola epidemic or polio vaccination in Nigeria (Larson 2020).

The 'bleeding eye disease' in Ethiopia, which was identified by some online news sources but denied by global health sources, was the subject of much online discussion (Tasnim News Agency 2020). This disease was explicitly called Disease X and attributed by some news sources to the tick-borne Crimean-Congo haemorrhagic fever (Bateman 2020). However, on social media 'bleeding eye disease' was described as 'proof' of Disease X and linked to several potential causes, including Chinese-led mining that was taking place in Ethiopia. Although an analysis of the actual events that led to these representations are beyond the scope of this article, the authors were not able to verify the existence of the phenomenon through consultation of scientific articles or the reports of global health agencies.

Online engagement with the prediction of Disease X helped set the stage for COVID-19 that emerged less than two years later. Lakoff writes that, 'the invention of a concept, such as emerging, infectious disease is a significant event not just because it marks the discovery of what had hitherto been unknown, but because it helps bring a new kind of entity into being' (2017, 7). The strength and salience of online narratives that drew from imaginaries about weak health systems and contexts of African countries ripe for exploitation were intertwined with and supported by global health warnings. These imaginaries about an upcoming infectious threat highlighted uncertainty and a lack of social trust that was based on previous experiences.

As COVID-19 emerged and governments along with global health agencies and civilians struggled to respond to the new threat, past failures in epidemic control—which had been highlighted to a greater degree than had previous successes—were again at the forefront and fed into rumours and conspiracy theories about this pandemic. Recent research in Nigeria, for instance, shows that 'a fear of the unknown and a deluge of information in the digital space creates fertile ground for fake news. Nigerians may be particularly vulnerable not because they are uniquely gullible, but because of weak communications between the government and the governed, high reverence for miracle healing and a dilapidated health care system' (Hassan 2020).

Disease, destruction, and 'the other'

Predictions about an upcoming pandemic invoke 'a space of apocalyptic expectation, one that seem[s] to be infinitely expandable' (Caduff 2014, 2). Despite many African countries having been deemed among the least prepared by the GHSI report of October 2019, they proved to be some of the most resilient to COVID-19 in the first year of the pandemic. The findings of this research show an 'apocalyptic expectation' that continued to be fed by narratives about Africa as being under-prepared (Aitken et al. 2020), including in the latter dataset, which captured conversations taking place during the COVID-19 pandemic. Imaginaries created around the metaphor of Disease X and the potential consequences of the emerging pandemic also seemed to be shaped (and were shaped by) these narratives of Africa as a place at high risk of devastation, either through intentional actions or natural causes.

The results of this research point to a need to closely examine the political stakes of representation when it comes to future pandemics and the African continent. An exoticisation of cultural threats was often embedded within narratives of risk in our research, both before and during the COVID-19 pandemic. Questions about the impacts of geopolitical relationships, such as that symbolised by China's growing presence in Africa, or previous global health responses led by actors from Europe and North America were also highlighted in online imaginaries. Fears related to Disease X mobilised apprehension that centred on external threats, as well as about health risks that would reflect existing economic fractures.

In our research findings, we saw how individuals worked to create meaning from diverse representations of places, people, and ideas. Scientific sovereignty seemed to be challenged by the easy availability of anecdotal evidence and alternative perspectives, all within a framework marked by uncertainty, through scientific discourse (e.g., about Disease X or COVID-19) or empirical evidence (such as previous epidemic response activities or economic precarity). Disease X is one example of how these broader representations became embedded within a

single entity—one that did not, in fact, exist. While our analysis shows that Disease X was broadly considered as a disease with a very high case fatality rate that could potentially exterminate Africans, this is different from representations of COVID-19 in most of sub-Saharan Africa, where it is considered by many to be less dangerous than other health threats. Looking at the devastation wrought by COVID-19 outside the African continent has led to a perception of the disease as being more dangerous for non-Africans, contributing to a collective understanding that the true Disease X in Africa has not yet occurred.

Narratives describing similarities between China and Africa in relation to risk raise questions about the imaginaries surrounding these two places, both within and outside the African continent. As described in recent work about visual misinformation during COVID-19, images used to support arguments about the destruction threatened by 'the other' were often taken out of context (Brennen, Simon, and Nielsen 2020). These images often came from preparedness exercises, past epidemics, or fictional accounts. Like imaginaries about risk and blame of individuals thought to be the cause of negative epidemic outcomes, imaginaries about the potential weaknesses and dubious intentions of global health were also mobilised.

Limitations of online ethnography

The internet can be a place to identify the broad strokes of narrative streams. However, it is difficult to fully examine the contexts that shape these narratives. Our data collection methods did not allow us to collect personal detail about the people writing the posts or articles that we analysed. In addition, even though Meltwater includes a geolocation function, most of the posts were not able to be geolocated, which is an issue that affects all social media research. Previous studies demonstrate that approximately 0.85% of tweets are geotagged—meaning that the exact location of the author when the tweet was posted is recorded using longitudinal and latitudinal measurements (Sloan et al. 2013). This very low proportion is for two reasons: geo-tagging is turned off by default on most mobile devices and many people do not know how to activate it—or even that their mobile device is capable of geo-tagging their tweets. Second, there is increasing concern over privacy issues and leaving a digital trail (Kapadia et al. 2007; Coll, Glassey, and Balleys 2011). Other researchers have also acknowledged this limitation (Sloan et al. 2013; Sloan and Morgan 2015). People who engage in discussions online may be representative of certain parts of the social world, but we are aware that they do not represent everyone. We recognise that on the continent of Africa, especially in rural areas, many people do not have reliable internet access, and that those who do may share important socio-demographic characteristics and that this shapes discourse. In an online environment, individuals interact without making their social differences explicitly known. We do

not assume that the imaginaries described in this paper are representative of the public as a whole, but rather a part of the public of 'non-experts' in global health. Even if we do not know exactly what part of the public this is, the themes that emerged here are important for consideration. The study population is a self-selecting group of internet users with an interest in discussing and writing about Disease X and Africa, including those living in and those interested in the African continent.

We call for future, more targeted and in-depth research about some of the key narratives that emerged from this research. Despite this, the approach that brought the results presented here provides rich depth and analysis of some global and regional conversations at critical snapshot moments, both before and during the COVID-19 pandemic, and gives insight into how understandings and usage of Disease X as a term evolved during this period.

Conclusion

The findings of this research provide concrete examples of how conceptions of risk and meanings are constructed and circulated online during times of uncertainty. These narratives were fed by different imaginaries, empirical evidence, and scientific concepts—such as the Disease X metaphor. Originally created by the WHO as a tool on which epidemic preparedness could centre, the prediction of Disease X also fuelled conspiracies about the intentional creation of a menace that could destroy certain populations and benefit others. Imaginaries of Africa as a place that was unprepared to face a dangerous pandemic and could be exploited for financial gain contributed to discourse about Disease X and its destruction.

The finding presented here should not be considered separately from considerations around questions of race, racialisation, and white supremacy. The narratives and representations circulating about Disease X and 'Africa' were constructed within specific political and social frameworks highlighting a hegemony of global health actors and the Global North. These narratives of risk and imaginaries of future epidemics presented in this article can provide insight as to how ideas are proposed to and by the 'non-expert' public. They demonstrate how people create meaning when faced with a scientific concept, a global health crisis, inequities of power and agency, and the idea that other crises are on the horizon. The results of this research can offer additional insights into COVID-19 vaccine anxiety and social resistance to the enforcement of pandemic response measures. As Lynteris writes, the pandemic imaginary is 'a reflective surface, but [also] a creative principle' (2020, 10).

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