A Pandemic of Metrics:
affect and erasure in the assemblage of Covid 19

In short, models and simulations cut across boundaries of pure categories we accept in science, and sometimes politics. Some people might be tempted to see the compromises that models make — between the domains of the theoretical and the material, between their uses as pragmatic and representational objects, between different goals — as unsatisfactory, to see it as simple inconsistency or imperfection. But we might choose instead to see models and simulations as monsters necessary to mediate between worlds that cannot stand on their own, or that are unmanageable.

– Sergio Sismondo 1999

INTRODUCTION

The experience of COVID 19 got many ethnographers thinking and writing in new ways about metrics and themetrical infrastructures that were brought to bear with it; not in the least because what was at work rendering the COVID-19 pandemic visible far exceeded the rationalities of quantitative calculation (e.g., Anderson 2021; Block et al., 2020; Bermant, Soto and Ssorin-Chaikov 2020; Breslin et al. 2022; Christin 2020; Jones and Helmriech 2020). The confluence of a proliferation of metrics with a situation of radical contingency in effect turned many into amateur epidemiologists, looking to numbers to provide a compass to social and professional engagements, to adjudicate chances for survival and those of loved ones, footholds to find fault with political systems and to imagine collective economic futures. It is precisely because the metrics in these moments were so quintessential—because so many reached for them desperately—that their promise and power continues to demand scrutiny. Here, we offer a critical reflection on the way metrics co-created the covid pandemic and its afterlives, asking specifically: How did the metrics, as artifacts with peculiar and particular capacities, augment the life of a virus, creating secondary possibilities which collectively might be called *a pandemic of metrics?*

Long before SARS-CoV-2, metrical figurings were quietly creating the conditions for a pandemic. Zoonotic formations enabling viruses and bacteria to mutate, jump species and undergo further transformation within human herds have always been plentiful, as have been the crescendos of interactivity that intensified pathogenic exchanges, distilling moments of urgency over outbreaks that were always there on the horizon (Napier 2020; Brown and Kelly 2014). Predictive epidemiological and infectious diseases sciences have long offered metrical figuring of the pandemic as 'wave-like' (Jones and Helmriech 2020), carving prophetic messages about the inevitability of 'the next one' (Lakoff 2013; Caduff 2015). Metrics have also set in motion a looming recursivity in which viruses like SARS-COV-2 are sutured to political economic machineries, creating crises we can never really shake off (Erikson 2015; Wraith and Stephenson 2009; Roemer-Mahler and Elbe 2016). "Like infectious agents on an agar plate," Greene and Vargha (2020) write, pandemics "colonize our social lives and force us to learn to live with them, in some way or another, for the foreseeable future." We would add that this hegemonic

power is animated by metrics and their capacity to create a calculus of vulnerabilities as new clusters of socioeconomic precarity emerge and endure (Benton 2015; Ticktin 2020).

The term 'metrics' is widely used in population health as an umbrella term denoting a variety of quantitative measuring and emplotment processes. Metrics are never simply available in the 'real' world; they have to be carefully composed using the best available means of quantitatively 'reading' the world. They can be many different things, performing different operations in different epistemic spaces. The power of metrics derive in part from their ability to help experts manage the unknown in ways that are reliably (or at least statistically) reliable. Metrical practices do this by stabilizing the complexity of lived social worlds, turning transient, and irreducibly discrete phenomena into obdurate, reductive and comparable data through modes of counting, modeling practices, algorithmic emplotment, and statistical evaluations. Variously represented in graphs, charts, equations and diagrams, metrics are potent because they are scalar (able to move from small samples to population levels, for instance) and because they can be tested for validity.

It is precisely these powers that compel anthropological critique. In this effort, we join scholars who have interrogated global health metrics showing how they can distort perceptions of the world by both excluding information and by constituting new realities through commodifying, objectifying and essentializing social realities, revealing the stakes of metrical reasoning and praxis (e.g. Adams 2016; Bickerstaff and Simmons 2003; Greene 2009; Erikson 2019; Reubi 2018; Sangaramoorthy and Benton 2012). We also build upon recent social scientific critiques concerned with the social contingencies of mathematical models and how these quantitive operations themselves are generative of novel forms of sociality (e.g. Brown 2020; Rhodes and Lancaster 2020). Our goal here is to extend those insights to the metrical assemblage of pandemic life. To that end, we examine how the pandemic of metrics in relation to COVID-19 in the US and the UK worked in at least three ways: 1) as technological enactments that conjured a once in a century pandemic 2) as affective events that produced a manageable, and then an unmanageable, public: and 3) as instruments that mediated social worlds that at the same time, closed down opportunities for political accountability.

Undertaking this analysis is not an endeavor without risks. As conspiracy theories roiled and continue to roil government responses to large scale public health crises across the globe, an analysis of the compromises and fetishisms attendant to quantification at multiple points over the last years could seem inapparoriate and inopportune. Still, knowing that metrics are unstable, black-boxed, provisional, and capable of doing harm alongside their benefits neither forecloses the debate about their utility nor short-circuits the need for social science analysis. What is aim for here is a modest yet resolutely critical stance—one that takes metrics seriously as socially-vital technologies, necessary monsters we should not ignore.

Metrical Cohesion of the Pandemic Before it Was

One could tell the story of the pandemic assembling of COVID 19 as one that began with the modern efforts to map viral and bacterial outbreaks in the second half of the 20th century, and specifically to when a variety of metrical apparatuses were devised to decipher outbreaks from the mere whisper of possibility (Lakoff and Collier 2008; Caduff 2015). In the US, in some tellings, this history begins in 1951 with the US response to case reports of headaches, nausea and fatal hemorrhage among American troops in Korea as US epidemiologists working at the then newly formed CDC were deployed to find the cause (Duhigg 2020). Their success—tracing the outbreak to rat feces, and not a bioterrorist plot (as suspected)—led to the institutionalization of epidemiology as a special division at the CDC, the Epidemic Intelligence Service (EIS) -- replicating for public health what had been created for geopolitical security in the US federal government's Central Intelligence Agency. The fortunes of the EIS waxed and waned over the second half of the 20th Century, but its power was bolstered in the 1990s, as HIV/AIDS shifted funds from primary health care back toward infectious disease control. In 1996, The US CDC created a surveillance system called BioSense to detect emerging epidemics, largely focused on the US and Europe (Fearnley 2008). BioSense inaugurated a new paradigm in public health, one—directed towards deciphering syndromic patterns (respiratory and gastrointestinal arrays of symptoms) and detecting alterations, augmentations, and explosions of those patterns, rather than simply counting infection rates and deaths, creating a predictive apparatus that could see outbreaks coming. Narratives of 'the coming pandemic' were also strengthened by popular accounts that traced the progression from HIV and multi-drug-resistant tuberculosis to novel microbial outbreaks to socio-political and environmental changes occurring on a global scale (Garrett 1994).

In first two decades of the new millennium—the global health era—the emergence of Ebola, SARS and MERS along with increasingly potent strains of flu (Swine Flu, H1N1) legitimized and granted greater authoritative weight to models that could predict the path of outbreaks (which we return to below). Treatment and mitigation efforts increasingly gave way to strategies of prophylaxis,rawing resources away from public health infrastructure and pouring it into surveillance technologies, vaccines, and forecasting (Lakoff 2008, 2015; Porter 2016). At large European and UK institutions, the focus for anticipation was on stockpiling antiviral drugs, heightened regulation of laboratories, building surveillance technologies, planning and conducting preparedness exercises (Bingham and Hinchliffe 2008; Kirchhelle 2022; Rosner and Markowitz 2006). In other places, livestock and poultry were summarily culled to prevent possibility of viral spread (Hickler 2010). Moving away from identifiable pathogenic risks to anticipated pathogenic potentials further entailed collapsing temporal fields of operation: bringing the future to the present (Lakoff and Collier 2008), while also augmenting the militarization of public health (Masco 2014).

The shift to prediction called for the formation of whole new subdisciplines in global health. Infectious disease MDs, pathologists, virologists and zoonosis experts teamed up with emergency responsiveness experts, financial wizards and epidemiologists to map the viral future using ever more sophisticated metrics that focused less on empirical data (evidence of what was already known) and more on the designation of sentinel figures (devices, animals, early human cases, and also investment payloads, financial risk, win-win scenarios and cost effectiveness strategies) (Lakoff 2015; Lachenal 2015; Erikson and Johnson 2020). In 2005, the WHO called upon its Emergency Committee to create a centralized governance infrastructure for coordinating

epidemic response with "sole power to declare the beginnings and endings of Public Health Emergencies of International Concern (PHEIC) (Greene and Vargha 2020). In the US, Dennis Carroll, a virologist, formed a pandemic-threats unit at the U.S. Agency for International Development called PREDICT to support discovery of potentially dangerous new viruses before they spill over into humans" (Quammen 2020). As experts liked to say often and in many venues from Davos to TED talks (in words echoed by politicians), it was not a matter of *if*, but rather *when*, the next pandemic outbreak would appear (Lakoff 2008:34; Osterholm et al 2015, Caduff 2014; Cooper 2006). This certainty was located in metrical knowledge.

One such metric used by the Institute for Health Metrics Evaluation (IHME), was built from the templates designed at the London Imperial College for modeling infectious disease outbreak and spread as well as predictive mortality. These instruments were called SIR-type and took into account Suspected, Infected and Recovered (SIR) population metrics along with country-specific data, including social distancing policies, hospitalization rates, and death rates (among other things), to forecast the dynamics of the outbreak in its early (pre-pandemic) stages with early indicators of numbers of infections and deaths (Walker et.al. 2020; Fuller 2020). The IHME used the SIR design to craft its own modeling system, extrapolating curves from previous SIR models to create what is called a "curve fitting model" based on predicting how other similar viruses would progress in a population over time (Fuller 2020).

So how specifically did these metrical practices bring the COVID 19 pandemic to life? In a now familiar story, on December 2019, the spark of recognition of a pandemic materialized when a merchant who worked in a local wet-market presented with SARS-like symptoms to his clinic in Wuhan China. Over the next weeks, laboratory experts would decipher from this man's sputum, and a cluster of other sputum samples from Chinese patients, the evidence of a novel coronavirus, 2019-nCoV, now known as Sars-CoV-2, causing the disease now colloquially known as COVID-19.

China's viral experts who had been trained by US pandemic experts were in communication with the US CDC about the outbreak. Information about the novel virus moved quickly into the airways of pandemic preparedness (Wu and McGoogan 2020). Public and academic accounts of the events note the following: one week after China's experts deciphered the novel virus, an EIS trained physician named Francis Reido, an infectious diseases expert who lived in Seattle, was alerted to a 35-year-old male patient who presented to an urgent care clinic in Seattle with a four day-old cough and fever (Duhigg 2020; Holshue, et.al. 2020). His case might have been unremarkable (indeed he was sent home after leaving some swab samples) but for one thing: he had just returned from visiting relatives in Wuhan China. The patient reported that he had seen the US CDC's health alert about the outbreak in China, thus felt he should go to the clinic once he had symptoms. This disclosure prompted his physician to call to Reido, who immediately alerted his team of Epidemic Intelligence Service CDC-trained colleagues around the world.

Reido guessed that the virus might possibly already be more widely spread. To test his hunch, he randomly selected and tested two other patients in the Seattle area who had similar symptoms. One tested positive as a match for SARS-CoV-2. Reido raised alarm bells about this second case because he was someone who had no known exposure to a Chinese source. His

colleagues then turned up an additional fourteen cases of seropositivity of SARS-CoV-2 in the US, some with full blown symptoms of Covid-19 (Duhigg 2020). Samples of the novel virus were sent to global institutions in Hong Kong, Berlin, Atlanta, and Hamburg where scientists developed various diagnostic tools that could be used to detect it in humans all over the globe (Wu, F. et.al. 2020). By January 30th, 9976 cases were ascertained in 21 countries (including China and the US) (Holshue et.al., 2020), making it a global phenomenon though still not the once in a century pandemic that it would come to be called very shortly thereafter.

It is worth noting here that the mere identification of a novel coronavirus was not enough, in and of itself, to establish a pandemic. Novel viruses emerge all the time and spread globally at rates higher than those of SARs CoV 2 at the time these data were collected. And yet, only a few weeks later, when Italy had experienced only one death from COVID-19 and Iran only ten, Bill Gates was already publicly calling COVID-19 a "once in a century pandemic" (Gates 2020). To be sure, what made it this, was not the high infection or disease counts, but rather the predictions that IHME's algorithms were modeling. Disease X, in the Pandemic Preparedness Platform (P3) (Global Biodefense Staff 2018), now had a name, and despite how little was actually known about its pathogenesis or deadliness. The IHME models painted a very frightening picture, affirming that Sars-CoV-2 would indeed cause a 'once in a century' pandemic that, if their metrical figuring was correct, would swiftly overwhelm hospitals and kill multitudes.

The facts about SARS-CoV-2 had their own agency, but they also needed to be catapulted from empirical platforms into public circulation. They needed footholds or anchors to propel them forward. They required 'once-in a century' metrical figuring—the kind offered by IMHE—that could weigh in and cut through the competing and tension-filled debates over how dangerous the virus really was or was not based on projections of what it was likely to do amidst competing models and the sociopolitical contingencies that made some models more likely to be taken seriously than others. The IHME model settled that mystery over contagion and turned it into a public health emergency of international concern, boot-strapping an archepelago of cases into an anticipated global rate of infection that demanded mass mobilization of response.

We do not mean to suggest that the viral risk was not acutely real. COVID-19 caused (and indeed, continues to cause) tremendous suffering and death, undoubtably more than has been actually counted (Sun and Achenbach 2020). Had nations not responded with the measures they did, mortality might likely have been immeasurably greater. What we are saying is that the COVD-19 pandemic that came into existence could only have occurred because of the anticipatory metrical practices that were used to transform SARS-COV-2 from a viral possibility into a matter for global health concern—a configuration of a pathogenic problem that delimits a very narrow and singular set of responses, experiences and potential solutions under its identification as a once in a century pandemic.

In the next two sections we explore the analytical benefits of this unpacking of the metrical reasoning of COVID 19, in two ways. First, we explore the mechanisms at work in the exchange between metrics and publics, showing how metrics operated as both technical skills and technologies that mobilize various *affects*, simultaneously bringing the pandemic into existence and elongating its duration by inviting us to remain attuned to its emergency even while, at times, undermining it with a veritable ocean of (often conflicting) metrical iconography.

Second, we turn to the ways that the metrical constitution of COVID 19 both before its time and while it unfolded enabled erasures of health and vulnerability that might have enabled different kinds of public health responses.

Algorithmic Affects

COVID 19's 'once in a century' trajectory was brought forth through algorithms. An algorithm is a pre-defined operation to answer a specific problem—in the mathematical lexicon, it is an *effective* method. Through arithmetic rules and finite parameters, algorithms provide an order of march: instructions on what to buy, where to build or whom to arrest. Algorithms speak to the future, projecting scenarios that tether an eventuality to concrete actions and actualities, "clos[ing] down unknowns into a governable present" (Rhodes, Lancaster and Rosengarten 2020). That power to adjudicate decisions, to intervene, to *effect* lives and livelihoods is fueled by a heady combination of objectivity and obscurity (Ziewitz 2016) enabling transition from the vicissitudes of decision-makers to the province of quantified and digitized protocols carried by the complexity upon which algorithmic orders are based (Erikson 2015; Kolkman and Kemper 2017).

The agency of algorithms is a feature of their inscrutability, of how the provisional quality remains hidden, not only of the axiomatic methods but of the future scenarios they address. In situations of crisis, where conventional forms of expertise and governance are stretched, algorithmic analyses become imperative. The greater the uncertainty of threat--the degree to which it is perceived as unprecedented—the less data-driven and more imaginative metrical thinking must become. The COVID-19 pandemic was called a 'Black swan event,' an event that demands speculative and creative modes of response because it comes as a surprise and will likely have a huge impact. Such events, Osterholm et.al. (2015) note, demand a way of thinking forward "which is ultimately aimed at securing our collective future." The power of some algorithms like that used by the IHME or the SIR models is not simply in their ability to harness predictable certainty from a series of unknowns, but also in their ability to harness affective responses. These affective powers reside in the way images of algorithmic predictions can be presented as graphs, charts, tables, that render a certainty out of a sea of competing facts. In other words, the nexus of power at work in representing events by way of algorithms is one that requires a passage through and mobilization of public affects. Predicting a pandemic from clusters of deaths hinged upon the participation of publics and expert institutions organized for anticipatory responsiveness sparked into action by the charismatic and aesthetic command of their projections.

Over and above their empirical basis, graphic presentations of algorithmic models (predicting futures and counting presents) have a visceral appeal, particularly when conveyed in easily readable form. The unique communicative power of the epidemic curve is a graphical referent for the anticipated experience of disaster. For COVID 19, the most commonly seen algorithmic projections were 'hockey-stick' projections—borrowing from the grammar of climate science (Demeritt 2006). They indexed exponential growth, an inflection point of irreversible acceleration from disparate points of contagious contingency, offering a curve trajectory, propelling us into a dismal future. A iconic form of 'pandemic prophesy,' these

projections articulated a eschatological structure of feeling—the nightmare of wild and unfettered contagion capable of catalyzing global response (Caduff 2015, Sampson 2012).

COVID's curve, in short, commanded a negative aesthetic charisma (Lorimer 2007); moral and political imperatives that were inscribed in its very form. As Neil Ferguson, a prominent Imperial epidemiologist who would become a central figure in the UK COVID-19 response, put it: the images help us "…to wake up the world and say that this could be really bad if we don't do anything" (The Economist, 2015). The fact that predictions could be off by millions (as they were, for instance, with the 2014-2016 West African Ebola Outbreak), or not yet actual (as in the case of COVID 19), did not undercut the authority of the hockey stick image. The curve belongs to the future anterior: its appalling upward slope communicates what we need to do to avert the disater it fortells.

In the early days of the COVID-19 outbreak in the UK, the algorithmically derived curve functioned in this way—an epidemiological prophesy that by ignting panic, animated new publics seeing themselves reflected in and subjected to their communicability (Briggs 2022). "This is a national endeavor" Matt Hancock, then the embattled UK Heath Secretary, told the UK public during one Daily Covid briefing. "And whatever the headwinds, as a country we can't let up on this. We are past the peak. We're flattening the curve. We protected the NHS and the number of deaths is falling. We must keep our resolve" (West Bridgford Wire 2020). However, the sense of social solidarity, was soon replaced by confusion over how to read the inundation of quantification about the actual pandemic. Algorithms competed with algorithms (the hockey stick vs. the parabolic curve). Ways of counting were set against other ways of counting (should deaths from comorbidities count as COVID deaths? Which countries/states/counties were counting correctly, if they were counting at all?) Whose metrics should be trusted?

As the outbreak progressed the collective sentiment of urgency eroded. Affective certainty was also undermined by the conflicting messages offered by the self-evident curve on the one hand and the blatant disregard of it on the part of government officials and technocrats who flouted lockdown rules on the other, but also because of the conflicting affects that were aroused by these metrically-conjured images. Multiple peaks, ebbs and surges lacked the kind of terrifying tidal simplicity to affect populations and effect uniform response (Jones & Helmreich 2020), even as case fatalities increased by some counts. If anything, Covid-19 algorithms began to point backwards, to the conditional past rather than the probable future, and along with that gaze a sense of moral judgment over inaction and a moratorium on governmental negligence surfaced.

The algorithms crafted in hindsight worked through a counterfactual. They imagined present times that would look different had publics been more responsive to the curves. In his testimony before Parliament after the first wave, Ferguson reprised his reliance on the prophetic powers of the algorithm, now as Cassandra: "the epidemic was doubling every three to four days before lockdown interventions were introduced. So had we introduced lockdown measures a week earlier, we would have then reduced the final death toll by at least a half".[1] As an artefact

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[1] Evidence given at the House of Lords Science and Technology Committee, 10 am on Tuesday June 2nd, 2020 on the role of modelling in the UK Response. For full session see: https://www.parliament.uk/business/lords/media-centre/house-of-lords-media-notices/2020/may-20/covid19-the-role-of-modelling-in-uk-response-

of failure, the curve would now summon anger, enough to refashion the pandemic into a public shaming of government figures. The curve's affective encumbrances unleashed effects and affects that could not be contained. Algorithmic metrics are propelled by this paradox: if the projection is heeded, then the pandemic as forecast does not come to be. Because the algorithm is unverifiable and self-referential, the metrics force us to look simultaneously backward and forward in a kind of counterfactual affect that makes it impossible for us to know for sure, but it nevertheless fills us with a surfeit of emotion all the same. The urgency that the algorithms are designed to produce comes back to haunt the present as a betrayal of its certainty and a mixture of unleashed emotions. Filled with the sense of awe and fear about the future and the 'could-have-been past', the metrics colonized life by way of the weight of social and personal demands they continued to make on citizens. They offered an idiom for collective distress and social action, at least in the early days. As pandemic progressed, the variety of experiences living with and through COVID-19 began to depart from and compete with the singular narrative relayed by the models. Epidemiological reason buckled under the pressure of metrical precision and the charisma of the curve could no longer sustain a pandemically tamed public.

Metrics, Misdirection and Displacements

Matt Hancock used the term 'headwinds' to describe the "calculated publics" assembled together through the mechanisms of epidemiological description and visual display (Braun and Gillespie 2011). These can be contrasted with what we might call tailwinds, that capture the often uncontainable effects of metrical figuring and their affective provocations. In her analysis of the swelling of COVID conspiracy theories online, Renee DiResta, Research Manager at the Stanford Internet observatory, pointed to the powers of social media platforms to facilitate questionable content promotion, facilitate rumors and spread misinformation. The sheer volume of social content, she writes, breeds 'inadvertent algorithmic amplification' and "infodemics" that recursively feed upon their own logics, forging connections that elude and confound efforts of regulation (Cinelli et al 2020). Covid-19's algorithmic affects became a feature and failure of their own scale; the sheer volume and intensity of connections between sentiment and metrical projections first forged, and then undermined, coherent curves or resolute, calculated publics.

The metrics of COVID-19 that came to publics in the form of predictive trends, counts of death and morbidity rates, and maps of danger zones based on these counting practices came with assumptions. One assumption was that a continuity could be sustained between the metrical images (the hockey sticks and flattened curves) and public responsiveness – they came with an assumption that the public could be counted on to act as an obedient crowd, to move between the contagious crowd—the immunogenic herd— and the responsive political collective (Mazzarella 2010). "Indeed," as David Napier (2020) notes, "changes in the herd are all about how we act together as a population." Here too, the passage point that would allow the metrics to be transformed into public responsiveness was affect; metrics forged a sense perception among publics who could move that behavioral wave. The problem, however, was that, as Mazzarella (2010) notes, the public was not a crowd; it was a multitude – a vital multiplicity of autonomously responsive beings, not a lifeless, mediated collective. The publics who were

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watching those curves were not uniform or uniformly affected by the beauty or horror of these representational practices, nor did they respond uniformly.

Added to this, or perhaps helping to ensure this, the metrics formed something of a pandemic, proliferating with an intensity and with an infectious sense of obligation to watch and read them, tethering along publics who tried to gauge their travel, social plans, risk taking, mask disposing and their collective sense of anger or frustration over public health accomplishments and failures. The metrics themselves became messy and contradictory, with curves, surges, and scales that became impossible to pay attention to or comprehend. They did not settle, offering openings for public suspicion and doubt that tracked, to some degree, the fact that experts themselves argued over how to count things like deaths and morbidities and how to represent them as both realities and scalar probabilities.

For instance, debate between epidemiologists and infectious disease experts produced different modes of representing the viral threat, with one focusing on infectivity and spread and the other on how to count morbidities and deaths (and when not to count them as COVID deaths). Indeed, competing approaches to modeling were being suggested by different kinds of experts. Clinical epidemiologists like John Iaonnidis (2020), argued against the models on grounds they were not evidence-based, thus even though quarantine measures were advisable, the assumption of an unprecedented high mortality pandemic was putting the cart before the horse (Fuller 2020). Mechanistic models were set against forecasting models, with one side focusing on predictions based on mechanisms of spread and pathology and the other on built projections based on previous epidemic outbreaks (Buckee 2020). Different kinds of futures were proposed from country to country, with different countries using different metrical tactics that calibrated national concerns. The IHME models used in the US were designed specifically to forecast death rates and hospitalization demand, but they did not take into account variation in mechanisms of transmission or how these mechanisms would alter rates in ways the UK models did (Eker 2020).

Models deployed within different institutional cultures created conflict among experts that were not simply turf wars over expertise, or battles between theory and application; they were also a result of metrics' built-in contingencies and limitations that became hidden as they adjudicated pandemic life (Bickerstraff and Simmons 2003; Lenzer and Brownlee 2020). As publics animated the metrics, often at the behest of governments as people were asked to make them part of life and everyday decision-making, the provisionality of the models disappeared. At the same time, the constant demand for more information and the ratifying of that information by the media ended up producing second-order effects, looping scientific forms of metrical guesswork and 'feeling in the dark' into unanticipated places (Briggs and Mantini-Briggs 2016). An over reliance on the metrics was coupled with the simultaneous production of an inability to trust them because they offered contradictory facts. Vernaculars of competing expertise were mistaken for uncertainty about the actual risk and impact of the virus. The contradictions were not read as limitations of any given model, pointing to what some have called 'modeling hubris' (Satelli et.al., 2020). Rather they were read as disciplinary debates by experts but as untrustworthy publics who did not know these differences or these limitations.

As new contours of viral effects were being mapped, displacing models of morbidity and mortality, and new ones were rolled out, few questioned the fact that none of these models could be tested, even by their own standards. An accurate assessment of the reliability of models demands an understanding of the true prevalence of the virus—a fact that was (and remains) unknown because of the existence of many asymptomatic cases and the broad limits of testing and reporting. That epistemic uncertainty, utterly fundamental to the metrical appearance of the COVID-19 pandemic, was persistently overlooked. Regardless, the pandemic was affirmed over and over again by the metrics because the metrics had already become the means by which the pandemic was made 'real.' Public audiences conferred on the metrics their power to do/or make what the audiences (and planners) wanted or needed through forms biomediatization (Briggs 2022).

The fact that unreported cases of COVID 19 continued to hover at the edges of epidemiological accounting, not only because some nations did not count their rates but because even in places where counting was happening, reporting was not mandatory, making any statistical management of the virus problematic. COVID 19's deadliness will never truly be known in relation to its infectivity rate without knowing for sure how many people actually had the virus and recovered without reporting it, even when it was symptomatic. Gaps like this were imagined by publics as gaps that also made the numbers untrustworthy, generating suscipion and that weakened the ability for the metrics to govern uniform public responses.

From collective anxieties to the splintering of sentiments of disregard, anger, betrayal, mistrust and panic, metrics brought about a pandemic that could not be contained. Indeed, the algorithmic metrics of COVID-19 created affects that rapidly exceeded the intentions of their creators—an effect that once again reveals their constitutive power. The surplus affects generated by metrical practices displaced the ability for public health efforts to accomplish their primary goals of generating safe responses. These affects floated at the edges of modeler's field of vision, unleashing effects that may or may not have been intended (Dixon & Chandler 2019). These might be called 'viral' potencies of the metrics in the sense that their real effects spread of their own accord, whether in motivating commitment to vaccines and masking or, conversely, refusing these practices on grounds that were untrustworthy. These unanticipated effects were a consequence of the excesses of metrical representations as much as they were an effect of their rationality.

Metrical Erasures

Metrics used to count case loads and death rates of COVID 19, along with the predictive metrics that warned of mass mortalities, distilled the story of the pandemic as being primarily about an infectious and deadly virus on the move. This viral narrative, however, displaced or effaced other stories that underpinned COVID 19's deadliness. SARS CoV-2 was not an indiscriminate agent. As many anthropologists have noted (Manderson, Burke, and Wahlberg. 202; Oliveira and Aguiar Arantes 2020), some communities were more at risk for both contracting and dying from it than others. Moreover, the metrics that focused on viral movements had a hard time tracking those aspects of the pandemic that did not behave like a typical virus, including those whose experience of COVID 19 persisted. What stories might have been told had the metrics focused on, or included, these confounding factors?

For instance, consider the non-story of New York City—ground zero for the opening wave of the US pandemic, where the viral metrics could have changed the modeling arc. In that city as elsewhere across the country, the chronically high and maldistributed burden of comorbidities shaped viral outcomes. As SARS-CoV-2 became the narrative organizer for mortality, death was channeled through the pandemic narrative, with its accelerated timeline, it's need for an Aristotelian arc that made it time-limited, with a beginning-middle-and end, appearing as a 'new' burden of illness (and mortality) that was constituted as unacceptable. The viral agent took over as the lead actor because it, in some sense, fit with the viral pandemic version of how this mortality was caused. What was effaced in this narrative was the story about the production of co-morbidities that actually underpinned higher death rates, the toxic foods and chemical exposures, the racism baked into our health care system at every level— all of which have contributed to the long and steady state of debilitation and slow death especially in the US. Rising slowly, creeping up over so many decades, the counting of co-morbidities and their causes became normalized in the viral story as static variables rather than as causal of morbidity in and of themselves (Adams 2020; Caduff 2020).

The organization of data into globally and regionally comparative sets meant to signal rising and falling rates of peril and burdens of loss in a given jurisdiction effaced the hierarchies of risk and disposibility of a given municipal or state population. Risk factors that were tied to social inequalities remained largely invisible in the daily accounting of morbidity and deaths that circulated as policy-making instruments. In these metrics, morbidities of so-called "essential workers" who were unable to quarantine were lumped in with those whose morbidities were a consequence of other risk exposures (Livingston 2022). What might our sense of the pandemic's viral potencies been the numbers focused on how these subpopulations were over-exposed to it in relation to basic social inequalities of labor and wealth? How might our ability to understand the pandemic, and to generate effective responses, have been different if our counting practices had offered more subtle distinctions based on the social contours of risk that preceed and outlive the virus?

It is true that eventually some efforts were made to locate high risk populations in residential institutions. Specifically, nursing home cases and deaths were counted alongside those in city jails and state prisons. A portion of the pandemic was now metrically and materially sealed off from the general public in the institutions. Visiting was suspended to either kind of institution and relatives worried from a distance, imagining worst case stories spun from the metrics. Despite their radically different positions vis a vis one another, staff and elderly nursing home residents; guards and incarcerated persons shared in the high rates of infection. Both types of institutions—nursing homes and prisons— amid their different functions in American society carry the taint of social death. The sealing off of metrics into institutional sub-epidemics here glossed crass questions and equally crass answers. Once we had the numbers, did this counting lead to efforts to improve conditions of living at such places? No, they too were wrapped around the narrative of viral exposure, and questions about whether a death in a nursing home *counted* the same as death among the "general" public were raised. Those whispered eugenics (Cohen 2020), combined with the crisis temporality of the pandemic to subtly shift affective orientation to the metrics making unusually high rates of death-inducing living conditions visible as artifacts *of a virus*, not as ongoing and persistent forms of societally-produced premature death.

1

The metrics of COVID 19 used by epidemiologists did eventually try to isolate key variables or expressions for quantification, to examine factors in isolation and then in modeled, abstract combinations. But the modeling of the pandemic as singular *event*, albeit a highly complex and multifactorial one built out of big, dynamic, and complex data sets, bounded the story of the pandemic from bigger story of disaster in which it sat. Suspended from the narrative, or relegated to its margins is the refugee crisis that months before SARS-CoV-2 was the subject of much metricization, even as the pandemic demonstrated that it was the air travel of the wealthy and not the rubber boats of the poor and displaced that spread disease and economic turmoil. The fires, the hurricanes, the plastic-choked oceans, the sixth extinction were held off stage as causal relations of the pandemic death march. The viral narrative could not hold simultaneously damning evidence of bleach, the cleaning chemicals, the thousands upon thousands of tons of disposable everything whose availability was suddenly all the more important for safety than harm, metricized as proxies for political efficacy. The stock market ticker tape and the metrics of death and devastation continued to diverge, lurching forward toward the uptick in corporate profits on the mere premise (with no actual evidence) of things like vaccines.

The metrics of COVID 19 thus operated as instruments that concealed some realities while conjuring others as acts of artifice, driving forward the industrial complex of free-market competitors perched to 'rescue' under the rubric of emergency spending and social lockdowns, while simultaneously making it less possible for us to see how the virus was (and perhaps moreso) also about other forms of pre-existing health and existential risk. What was missed, in all this counting, however, were the emerging realities that did not fit the disaster event narrative form. Consider the multitudes of those whose symptoms of COVID 19 lingered, whose experience of the virus was one of chronicity rather than acute.

For those with what became named as 'long COVID,' navigating the experience of the coronavirus required wading through metrical indicators that were most often shown as cases and deaths. The quest for 'true' numbers required deciphering uncertainties produced through testing technologies, sampling strategies and attribution of fatalities to the virus. Population level statistical questions were both abstract to and instructive to individuals with symptoms hoping to understand and anticipate the effects of the virus as an embodied experience. What did it mean to become a 'case' and how might one anticipate becoming a 'death'? The conferring of a disease label, traditionally understood to enable access to both information—about the trajectory and ways to manage a disease— and treatment, were confounded by the sea of metrics that circulated already. The first challenges for many with symptoms was in accessing such a disease label, not only because the testing rules were uncertain but also because testing was unreliable, especially for those whose symptoms exceeded the 14-day expected symptom window. Symptomatic people were consistently turned away by health care services, left without the information or treatment they hoped to receive (see Callard 2020; Greenhalgh et al 2020).

The self-diagnosed soon became a sizable proportion of COVID-19 'cases,' joining those with official diagnoses who turned to online technologies to decipher their experience and produce collective knowledge in a manner familiar from patient experiences of other "contested illnesses" (Dumes 2019; Rogers 2022; Murphy 2006). Online forums for people experiencing

COVID-19 appeared on Facebook, Slack and other platforms, emerged early on in the pandemic and quickly accumulated thousands of members from all around the world. Reports of alarming pulmonary, heart and neurological symptoms, among other things began to float across the internet as people with symptoms tried to make sense of their lives. The COVID-19 Body Politic Slack Group (2020), for instance, polled 640 respondents at the end of April 2020 at a point when symptoms for most respondents were ongoing, averaging 40 days according to its survey. Sharing experiences to cross-check their own status, to seek reassurance and gain support for deciphering medical systems, members collectively formulated a metrical image of the disease that differed from those offered by medical experts. Members crowd-sourced data to create their own epidemiological analyses of the nature and trajectories of symptoms. Both of these dimensions—visceral and temporal—were notably encountered, narrated and calibrated through crowdsourced metrics.

Here, too, we could call attention to the way that the viral narrative that was used in most circulating metrics of COVID morbidity and mortality—those that presented it as a once in a century event that would be conquered by vaccines and good behavior—made it hard to hear those whose experience of the disease did not fit the mold of the time-limited event. Like the chronic morbidities that were treated as 'static' in the figuration of the virus's ebb and flow but not really counted, those whose experience of COVID 19 did not subside after the normative time found themselves neglected. In order to be seen, they had to bootstrap their own metrics and force their experiences into public visibility. The metrics here, too, co-constituted the pandemic and also the experience of it.

Coda

On May 5, 2023, the World Health Organization declared an end to the Global Public Health Emergency, three years after the SARS C0V 2 virus appeared on the viral radar of epidemiologists and even though the death toll of nearly 7 million people was still slowly increasing. Looking back, it would be hard to deny that COVID 19 pandemic was a once-in-a-century event. To what degree that exceptionality was a feature of the viruses trajectory across populations and place versus an artifact of the metrical storm through which the pandemic made landfall is now impossible to decipher. The coronavirus remains a total social fact—a tangled nexus of metrical and viral information, of political calculation and public affect, organizing and orchestrating new global realities.

By reflecting on some of the metrics of COVID 19 in relation to their power, their affective potencies and their narrative opportunities, misdirections and erasures, we have tried to focus on both possibilities—their co-constitution of the pandemic in conversation with the virus; their ability to craft affects and engage the public in ways that cannot be contained; their forging of narrative arcs that tell some stories while excluding others. Our hope is that by interrogating the pandemic in this way, we have also added more to the anthropological analysis of the way metrics work in our pandemic times. Pandemic metrics persist, haunting the present, waiting to offer prognostications of return or of an altogether new outbreak. At a minimum, we suggest that a critical interrogation of the metrics at work in the COVID 19 pandemic make it clear that the experience of COVID 19 was as much an experience of the metrics as it was of the virus.

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A Pandemic of Metrics

In short, models and simulations cut across boundaries of pure categories we accept in science, and sometimes politics. Some people might be tempted to see the compromises that models make — between the domains of the theoretical and the material, between their uses as pragmatic and representational objects, between different goals — as unsatisfactory, to see it as simple inconsistency or imperfection. But we might choose instead to see models and simulations as monsters necessary to mediate between worlds that cannot stand on their own, or that are unmanageable.

– Sergio Sismondo 1999

INTRODUCTION

The experience of COVID-19 got many ethnographers thinking and writing in new ways about metrics and the metrical infrastructures that were brought to bear with it; not in the least because the work of rendering the COVID-19 pandemic visible far exceeded the rationalities of quantitative calculation (e.g., Anderson 2021; Block et al., 2020; Bermant, Soto and Ssorin-Chaikov 2020; Breslin et al. 2022; Christin 2020; Jones and Helmriech 2020). The confluence of a proliferation of metrics with a situation of radical contingency in effect turned many into amateur epidemiologists, looking to 'the numbers' to provide a compass to social and professional engagements, to calculate the chances for their survival and those of loved ones.

Numbers presented in graphs, tables and maps as metrical figurations also created footholds for finding fault with political systems and for imagining collective economic futures. It is precisely because the metrics in these moments were so salient—because so many reached for them desperately—that their promise and power continues to demand scrutiny. Here, we offer a critical reflection on the way metrics co-created the COVID pandemic and its afterlives, asking: How did metrics, as artifacts with peculiar and particular capacities, transform a virus into what might be called *a pandemic of metrics?*

Long before SARS-CoV-2, metrical figurings were quietly creating the conditions for the distillation of uncertain biological phenomena into a *pandemic*. The scale and pace of infectious disease outbreaks are a feature of our contemporary predicament—environmental degregation, rapid urbanization, mass migration, and climate change have created the conditions for viruses and bacteria to mutate, jump species and amplify within human herds (Brown and Kelly 2014). Predictive epidemiological and infectious disease sciences have rendered those crescendos of pathogenic interactivity as 'wave-like' (Jones and Helmriech 2020), carving prophetic messages about the inevitability of 'the next one' (Caduff 2015). Metrics have also set in motion a looming recursivity in which viruses like SARS-COV-2 are sutured to market-driven preparedness agendas and reinvigorated protectionist policies, creating crises we can never really shake off (Erikson 2015; Wraith and Stephenson 2009; Roemer-Mahler and Elbe 2016). "Like infectious agents on an agar plate," Greene and Vargha (2020) write, pandemics "colonize our social lives and force us to learn to live with them, in some way or another, for the foreseeable future." We would add that this power is animated by metrics and their capacity to create a new calculus of vulnerabilities as clusters of socioeconomic precarity emerge and endure (Benton 2015; Ticktin 2020).

The term 'metrics' is used in population health to denote a wide variety of quantitative measuring and emplotment processes. Metrics are never simply available in the 'real' world; they have to be composed using available means of quantitatively 'reading' the world. They can be many different things, from standard measures and benchmarks to big data sets, models and actuarial estimates, all performing different operations in different epistemic spaces. Metrics carry performative power, derived in part from their ability to help experts manage the unknown in ways that are (at least statistically) reliable. Metrical practices do this by stabilizing the complexity of lived social worlds, turning transient and situationally contingent phenomena into obdurate, reductive and comparable data through modes of counting, modeling practices, algorithmic emplotment, and statistical evaluations. Variously represented in graphs, charts, equations and diagrams, metrics are potent because they are scalar (able to move from small samples to populations, for instance) and because they can be tested for validity.

It is precisely these powers that compel anthropological critique. In this effort, we join scholars who have interrogated global health metrics, showing how they can distort perceptions of the world both by excluding information and by constituting new realities through commodifying, objectifying and essentializing social realities, thus revealing the stakes of metrical reasoning and praxis (e.g. Adams 2016; Bickerstaff and Simmons 2003; Greene 2009; Erikson 2019; Reubi 2018; Sangaramoorthy and Benton 2012; Treichler 1999). We also build upon recent social scientific critiques concerned with the social contingencies of mathematical models and how these quantitive operations themselves are generative of novel forms of sociality (e.g. Brown 2020; Rhodes and Lancaster 2020, Richardson 2020). Our goal here is to extend those insights to the metrical assemblage of pandemic life. To that end, we examine how the pandemic of metrics in relation to COVID-19 in the US and the UK worked in at least three

ways: 1) as technological enactments that conjured a once in a century pandemic 2) as affective events that produced a manageable, and then an unmanageable, public: and 3) as instruments that mediated social worlds, even as they closed down opportunities for political accountability.

Undertaking this analysis is not without risks. As conspiracy theories continue to roil government responses to large scale public health crises across the globe, an analysis of the compromises and fetishisms attendant to quantification at multiple points over the last years could seem inapparopriate and inopportune. Still, knowing that metrics are unstable, black-boxed, provisional, and capable of doing harm alongside their benefits neither forecloses the debate about their utility nor short-circuits the need for social science analysis. As scholars from the UK and the US, our engagement is particular and situated, relying on an evidentiary field that arises from these two places during the time when COVID-19 predictions were being rolled out with extreme rapidity. We also share a common ethnographic orientation. Through various ways and in distinct contexts, our previous work has grappled with the performativity of metrics, concerned with the forms of global health attention and neglect they precipitate. COVID-19 produced in us, as authors, a real-time collective sense of critical disorientation, affected by and caring for, metrics in ways that merely depicting the gap between lived experience and quantitative representation felt inadequate to account for. By exploring the domain of the coronavirus metrics in action, we found ourselves convinced of the need to describe how the various metrics of this virus have travelled as objects with revelatory powers around which public health solidarities form, and as a means to live a pandemic way of life. What we aim for here is a modest yet resolutely critical stance—one that takes metrics seriously as socially vital technologies, necessary monsters we should not ignore.

Metrical Cohesion of the Pandemic Before it Was

To tell the story of COVID-19's metrical existence, one starting point would be the mid 20th century efforts to map viral and bacterial outbreaks (Lakoff and Collier 2008). In the US, this history begins in 1951 when epidemiologists working at the then newly formed CDC were deployed to find the cause behind case reports of headaches, nausea and fatal hemorrhage among American troops in Korea (Duhigg 2020). Their success—tracing the outbreak to rat feces, and not a bioterrorist plot (as initially suspected)—led to the institutionalization of epidemiology as a special division at the CDC, the Epidemic Intelligence Service (EIS), replicating for public health what had been created for geopolitical security in the US federal government's Central Intelligence Agency.

The fortunes of the EIS waxed and waned over the second half of the 20th Century, but its power was bolstered in the 1990s, as HIV/AIDS shifted funds from primary health care back toward infectious disease control—a move, which as Treichler (1999) suggests, built upon and entrenched dominant discourses of risk and intersectional politics of blame. In 1996, The CDC created a surveillance system called BioSense to detect emerging epidemics, largely focused on the US and Europe (Fearnley 2008). BioSense inaugurated a new paradigm in public health, one directed towards deciphering syndromic patterns (respiratory and gastrointestinal arrays of symptoms) and detecting alterations, augmentations, and explosions of those patterns, rather than simply counting infection rates and deaths. Its purpose was to create a predictive apparatus that could see outbreaks coming. Narratives of 'the coming pandemic' were also strengthened by

popular accounts that traced the progression from HIV and multi-drug-resistant tuberculosis to socio-political and environmental changes occurring on a global scale (e.g. Garrett 1994).

In first two decades of the new millennium—the global health era—the emergence of Ebola, SARS and MERS along with increasingly potent strains of influenza (Swine Flu, H1N1) granted greater authoritative weight to models that could predict the path of outbreaks. Treatment and mitigation efforts increasingly gave way to strategies of prophylaxis, drawing resources away from public health infrastructure and pouring it into surveillance technologies, vaccines, and forecasting (Lakoff 2008, 2015; Porter 2016). At large European and UK institutions, the focus was on stockpiling antiviral drugs, heightened regulation of laboratories, building surveillance technologies, and planning and conducting preparedness exercises (Bingham and Hinchliffe 2008; Kirchhelle 2022; Rosner and Markowitz 2006). In other places, livestock and poultry were summarily culled to prevent possibility of viral spread (Hickler 2010). The move away from identifiable pathogenic risks to anticipated pathogenic potentials further entailed collapsing temporal fields of operation: bringing the future to the present (Adams, Murphy, Clarke 2009), while also augmenting the militarization of public health (Masco 2014).

The shift to prediction promoted new communities of inquiry in global health. Infectious disease MDs, pathologists, virologists and zoonosis experts teamed up with emergency responsiveness experts, financial wizards and epidemiologists to map the viral future using ever more sophisticated metrics that focused less on case data (evidence of what was already known) and more on the designation of sentinel figures that signaled risky futures prior to actual outbreaks (devices, animals, early human cases) and the rationales for investment (financial risk, win-win scenarios and cost effectiveness strategies) (Lakoff 2015; Lachenal 2015; Erikson and Johnson 2020). In 2005, the WHO called upon its Emergency Committee to create a centralized

governance infrastructure for coordinating epidemic response with "sole power to declare the beginnings and endings of Public Health Emergencies of International Concern (PHEIC)" (Greene and Vargha 2020). In the US, Dennis Carroll, a virologist, formed a pandemic-threats unit at the U.S. Agency for International Development called PREDICT to support discovery of potentially dangerous new viruses before they spill over into human"" (Quammen 2020). As experts liked to say in venues from Davos to TED talks (in words echoed by politicians), it was not a matter of *if*, but rather *when*, the next pandemic outbreak would appear (Lakoff 2008:34; Osterholm et al 2015, Caduff 2014; Cooper 2006). This certainty was grounded in metrical knowledge.

One metric used by the Institute for Health Metrics Evaluation (IHME), was built from the templates designed at Imperial College London for modeling infectious disease outbreak and spread as well as predictive mortality. These so-called "SIR-type" instruments took into account Suspected, Infected and Recovered (SIR) population metrics along with country-specific data, including social distancing policies, hospitalization rates, and death rates (among other things), to forecast the dynamics of outbreaks in their nascent (pre-pandemic) stages with early indicators of numbers of infections and deaths (Walker et.al. 2020; Fuller 2020). The IHME used the SIR design to craft its own modeling system, extrapolating curves from previous SIR models to create "curve fitting model" for a range of hypothetical viruses, to predict their progress in a population over time (Fuller 2020).

So how, specifically, did these metrical practices bring the COVID-19 pandemic to life? In a now familiar story, on December 2019, the spark of recognition of a pandemic materialized when a merchant who worked in a local wet-market presented with SARS-like symptoms to a clinic in Wuhan China. Over the next weeks, laboratory experts would decipher from this man's

sputum, and a cluster of other sputum samples from other Chinese patients, evidence of a novel coronavirus, 2019-nCoV, now known as Sars-CoV-2, which causes the disease now colloquially known as COVID-19.

China's viral experts, who had been trained by US pandemic experts, were in communication with the US CDC about the outbreak. Information about the novel virus moved quickly into the airways of pandemic preparedness (Wu and McGoogan 2020). Public and academic accounts of the events note the following: one week after China's experts sequenced the novel virus, a Seattle-baed,EIS trained infectious disease expert named Francis Reido was alerted to a 35-year-old male patient who arrived at an urgent care clinic with a four day-old cough and fever (Duhigg 2020; Holshue, et.al. 2020). His case might have been unremarkable (indeed he was sent home after leaving some swab samples), but for one thing: he had just returned to Seattle from visiting relatives in Wuhan. The patient reported that he had seen the US CDC's health alert about the outbreak in China and thus felt he should go to the clinic once he had symptoms. This disclosure prompted his physician to call to Reido, who immediately alerted his team of EIS-trained colleagues around the world.

Reido guessed that the virus might possibly already be more widely spread. To test his hunch, he randomly selected and tested two other patients in the Seattle area who had similar symptoms. One tested positive as a match for SARS-CoV-2. Reido raised alarm bells about this second case because it was someone who had no known exposure to a Chinese source. His colleagues then turned up an additional fourteen cases of SARS-CoV-2 seropositivity in the US, some with full blown symptoms of Covid-19 (Duhigg 2020). Samples of the novel virus were sent to global institutions in Hong Kong, Berlin, Atlanta, and Hamburg, where scientists developed various diagnostic tools that could be used to detect it (Wu, F. et.al. 2020). By January

30th, 9976 cases were ascertained in 21 countries (including China and the US) (Holshue et.al., 2020).

It is worth noting here that the mere identification of a novel coronavirus was not enough, in and of itself, to establish a pandemic. Novel viruses emerge all the time and spread globally at rates higher than those of SARs CoV 2 at the time these data were collected. Yet only a few weeks later, when Italy had experienced only one death from COVID-19 and Iran only ten, Bill Gates was already publicly calling COVID-19 a "once in a century pandemic" (Gates 2020). What motivated this description was not the high infection or disease counts, but rather the predictions that IHME's algorithms were modeling. The IHME models painted a very frightening picture, affirming that Sars-CoV-2 would indeed cause a 'once in a century' pandemic that, if their metrical figuring was correct, would swiftly overwhelm hospitals and kill multitudes.

The facts about SARS-CoV-2 had their own agency, but they also needed to be catapulted from empirical platforms into public circulation. They needed footholds or anchors to propel them forward. They required 'once-in a century' metrical figuring—the kind offered by IMHE—that could weigh in and cut through the competing and tension-filled debates over how dangerous the virus really. Projections of what it was likely to do varied amidst competing models and the sociopolitical contingencies that made some models more likely to be taken seriously than others. The IHME model settled that mystery over contagion and turned Sars CoV 2 into a public health emergency of international concern, boot-strapping an archepelago of cases into an anticipated global rate of infection that demanded mass mobilization and response.

We do not mean to suggest that the viral risk was not acutely real. COVID-19 caused (and indeed, continues to cause) tremendous suffering and death, undoubtedly more than has

9

been actually counted (Sun and Achenbach 2020). Had nations not responded with the measures they did, mortality might likely have been immeasurably greater. What we are saying is that the COVD 19 pandemic that came into existence as a public health and political event could only have occurred because of the anticipatory metrical practices that were used to transform SARS-COV-2 from a viral possibility into a matter of global health concern—a configuration of a pathogenic problem that delimits a very narrow and singular set of responses, experiences and potential solutions under the sign of the "once in a century pandemic."

Algorithms Make Affected Publics and Then Disperse Them

COVID-19's 'once in a century' trajectory was brought forth through algorithms. An algorithm is a pre-defined operation to answer a specific problem—in the mathematical lexicon, it is an *effective* method. Through arithmetic rules and finite parameters, algorithms provide an order of march: instructions on what to buy, where to build or whom to arrest. Algorithms speak to the future, projecting scenarios that tether an eventuality to concrete actions and actualities, "clos[ing] down unknowns into a governable present" (Rhodes, Lancaster and Rosengarten 2020).

That power to adjudicate decisions, to intervene, to *effect* lives and livelihoods is fueled by a heady combination of objectivity and obscurity (Ziewitz 2016; Erikson 2015; Kolkman and Kemper 2017; Dixon and Chandler, 2019). In situations of crisis, where conventional forms of expertise and governance are stretched and where data is thin o the ground, algorithmic analyses offer a way to manage uncertainty, through axiomatic, if not highly imaginative, metrical

thinking. The COVID-19 pandemic was called a 'Black swan event,' an event that demands

speculative and creative modes of response—a way of thinking forward, according to Osterholm

et.al. (2015) ,"which is ultimately aimed at securing our collective future." The power of

algorithms like that used by the IHME or the SIR models is not simply in their ability to harness

predictable certainty from a series of unknowns, but also in their ability to harness affective

responses. These affective powers reside in the way images of algorithmic predictions can be

presented as graphs, charts, tables, that render a certainty out of a sea of competing facts—

models "a functionalist bent", in Murphy's words, "which purposively pushes aside complex

reactivity" (see Murphy 2017).

Over and above their empirical basis, graphic presentations of algorithmic models have a

visceral appeal, particularly when conveyed in easily readable form. The unique communicative

power of the epidemic curve is a graphical referent for the anticipated experience of disaster. For

COVID-19, the most commonly seen algorithmic projections were 'hockey-stick' projections—

borrowing from the grammar of climate science (Demeritt 2006). They indexed exponential

growth, an inflection point of irreversible acceleration from disparate points of contagious

contingency. A iconic form of 'pandemic prophesy,' these projections articulated a

eschatological structure of feeling—the nightmare of wild and unfettered contagion capable of

catalyzing global response (Caduff 2015; Sampson 2012).

The gradient of COVID's curve commanded this kind of negative aesthetic charisma

(Lorimer 2007). As Neil Ferguson, a prominent Imperial epidemiologist who would become a

central figure in the UK COVID-19 response put it: the images help us "…to wake up the world

and say that this could be really bad if we don't do anything" (The Economist, 2015). The fact

that predictions could be off by millions (as some were, for instance, with the 2014-2016 West

African Ebola Outbreak), or not yet actual (as in the case of COVID-19), did not undercut the authority of the hockey stick image. The curve belongs to the future anterior, its appalling upward slope communicates what we need to do to avert the disater it fortells: flattening the upward climb into a rounded curve downward.

In the early days of the COVID-19 outbreak in the UK, the algorithmically derived curve functioned in this way—an epidemiological prophesy that by igniting panic, animated new publics seeing themselves reflected in and subjected to their communicability (Briggs 2022). "This is a national endeavor" Matt Hancock, then the embattled UK Heath Secretary, told the UK public during one Daily Covid briefing. "And whatever the headwinds, as a country we can't let up on this. We are past the peak. We're flattening the curve. We protected the NHS and the number of deaths is falling. We must keep our resolve" (West Bridgford Wire 2020). (It was notwithout some irony that the briefing built around metrical persuasion coincided with the day that Public Health England stopped performing contact tracing as infections overwhelmed surveillance capacities).

Profile of the epidemic under different approaches

Illustrative impact of social and behavioural interventions
lasting several months on a Reasonable Worst Case epidemic

Figure 1: HM Government, 'Profile of the Epidemic under Different Approaches' Press Briefing, 10 Downing St., (12 March 2020).

To reduce the gradient from hockey stick to gently-sloping rise and fall, the public would have to be motivated—indeed impassioned—to play their role. And yet, the dissonance between the clarion call for civic spirit and the graphic form that patriotism took under COVID-19 were jarring, not just for the political content of his message but for its imaginative leap in transforming individual compliance into collective sentiment—an expression of belonging, compassion and concern anchored in the figurative power of the curve. Tantamount to what David Speigelhalter, UK Government's chief advisory statistician termed "number theatre," the Prime Minister's daily coronavirus briefings did not operate within the province of fact; with unreliable diagnostics, uncertain case definitions and an overwhelmed contact tracing system that had ground to a halt, pronouncements on the precise scale or scope of transmission could only

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ever be graphically gestural. The infographics conveyed if not statistical reason a form of policy rationale: a cruel kind of optimism, in Berlant's (2011) terms, making sense of price we must pay to secure our hopes for a normal future.
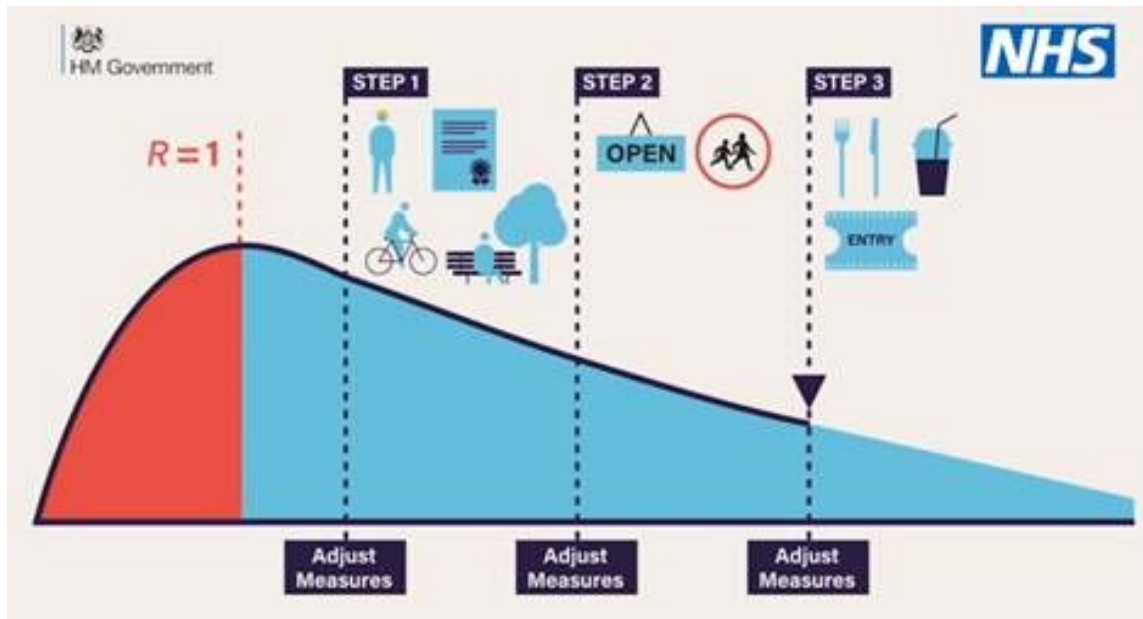
Those hopes were played upon and played out in a series of infographics, which smoothed the curve's charisma into a gentle downward slope to normalicy. Fueled by fears about the future, the curve served as an idiom for collective distress and rationale for personal sacrifice and social (in)action. But as the pandemic progressed, the variety of experiences of living with and through COVID-19 departed from and compete with the singular narrative the curve relayed. Many people were simply overwhelmed by the ubiquity of metrics, as numbers proliferated with an intensity and with an infectious sense of obligation to watch and read them, to integrate upticks and downtick to personal logics of risk, when to travel, who to see, whether or not to wear masks.

The metrics themselves became messy and contradictory, with curves, surges, and scales that became difficult to pay attention to, let alone to comprehend (Bickerstraff and Simmons 2003; Lenzer and Brownlee 2020; Jones & Helmriech 2020. They did not settle, offering openings for public suspicion and doubt that tracked, to some degree, the fact that experts engaged in public arguments over how to count, predict and mitigate COVID-19. Debate between epidemiologists and infectious disease experts produced different modes of representing the viral threat, with one focusing on infectivity and spread and the other on how to count morbidities and deaths (and when not to count them as COVID deaths). Clinical epidemiologists like John Iaonnidis (2020), argued against the hockey stick models on grounds they were not evidence-based, thus even though quarantine measures were advisable, the assumption of an unprecedented high mortality pandemic was putting the cart before the horse (Fuller 2020). Mechanistic models were set against forecasting models, with one side focusing on predictions based on mechanisms of spread and pathology and the other on built projections based on previous epidemic outbreaks (Buckee 2020). Different kinds of futures were proposed from country to country, with different countries using different metrical tactics that calibrated national concerns. The IHME models used in the US were designed specifically to forecast death rates and hospitalization demand, but they did not take into account variation in mechanisms of transmission or how these mechanisms would alter rates in ways the UK models did (Eker 2020).

The metrics of COVID-19 were presented to publics in the form of predictive trends, counts of deaths and morbidity rates, and maps of danger zones. Such presentations, however provisional, conjured a continuity between the metrical images (the hockey sticks and flattened curves) and public—that the public could be counted on to act as an obedient crowd, to move between the contagious crowd—the immunogenic herd—and the responsive political collective

(Mazzarella 2010, see also Napier 2020). Here too, the passage point that would allow the metrics to be transformed into public responsiveness was affect; metrics forged a sense perception among publics who could move that behavioral wave. The problem, however, was that, as Mazzarella (2010) notes, the public was not a crowd; it was a multitude—a vital multiplicity of autonomously responsive beings, not a lifeless, mediated collective. The publics who were watching those curves were not uniform or uniformly affected by the beauty or horror of these representational practices, nor did they respond uniformly.

As the authority of epidemiological forecasting wobbled under the diversity of thoses experiences, agonistic public sentiment both in the UK and the US increasingly revealed itself to be its own force in pandemic reckoning. As case fatalities increased and the rhetoric of "flattening the curve" lost its moral force—attenuated by the blatant disregard of it on the part of government officials and technocrats who flouted the rules that algorithms had been used to put in place. Rather than a probablable future, algorithms were used to reflect those failures, providing a counterfactual account of the present, based on projects of what could have occurred in the past. In his testimony before Parliament after the first wave, Ferguson reprised his reliance on the prophetic powers of the algorithm, now as Cassandra: "the epidemic was doubling every three to four days before lockdown interventions were introduced. So had we introduced lockdown measures a week earlier, we would have then reduced the final death toll by at least a half".[1]

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[1] Evidence given at the House of Lords Science and Technology Committee, 10 am on Tuesday June 2nd, 2020 on the role of modelling in the UK Response. For full session see: https://www.parliament.uk/business/lords/media-centre/house-of-lords-media-notices/2020/may-20/covid19-the-role-of-modelling-in-uk-response-/https://www.parliamentlive.tv/Search?Keywords=Niel+Ferguson&Member=&MemberId=&House=&Business=&Start=05%2F06%2F2020&End=11%2F06%2F2020

Algorithmic metrics are propelled by this paradox: if the projection is heeded, then the event-as-forecasted does not come to be. As an artefact of government failure, the curve would summon anger—rather than fuel for a future that may materialize, it generated mourning for a situation that might not have ever occurred. Public feelings drove complex and contradictory responses to algorithmic predictions, creating feedback loops inside the metrics themselves, as publics became increasingly skeptical of containment measures, influencing transmission trajectories. In her analysis of online COVID conspiracy theories, Renee DiResta pointed to the powers of social media platforms to facilitate questionable content promotion, facilitate rumors and spread misinformation. The sheer volume of social content, she writes, breeds 'inadvertent algorithmic amplification' and "infodemics" that recursively feed upon their own logics, forging connections that elude and confound efforts of regulation (Cinelli et al 2020; Stalcup 2020). An over reliance on the metrics coupled with a failure to communicate their limations had the effect of generating mistrust among members of the public. Increaseingly rarefied disciplinary debates over which transmission models were *more accurate* had the effect of discounting all models of whatsoever and with it the very real risks of infection.

As new contours of viral effects were being mapped, displacing models of morbidity and mortality, and new ones were rolled out, few questioned the fact that none of these models could be tested, even by their own standards. An accurate assessment of the reliability of models demands an understanding of the true prevalence of the virus—a fact that was (and remains) unknown because of the existence of many asymptomatic cases and the broad limits of testing and reporting. That epistemic uncertainty, utterly fundamental to the metrical appearance of the COVID-19 pandemic, was persistently overlooked. Regardless, the pandemic was affirmed over and over again by the metrics because the metrics had already become the means by which the

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pandemic was made 'real.' Public audiences conferred on the metrics their power to do/or make what the audiences (and planners) wanted or needed through forms of biomediatization (Briggs 2022).

The fact that unreported cases of COVID-19 continued to hover at the edges of epidemiological accounting, not only because some nations did not count their rates but also because even in places where counting was happening, reporting was not mandatory, making any statistical management of the virus problematic. COVID-19's deadliness will never truly be known in relation to its infectivity rate without knowing for sure how many people actually had the virus and recovered without reporting it, even when it was symptomatic. Gaps like this were imagined as gaps that also made the numbers untrustworthy, generating suscipion and that weakened the ability of the metrics to govern uniform public responses.

From collective anxieties to the splintering of sentiments of disregard, anger, betrayal, mistrust and panic, metrics brought about a pandemic that could not be contained. Indeed, the algorithmic metrics of COVID-19 created affects that rapidly exceeded the intentions of their creators—affects became a feature and failure of their own scale; the sheer volume and intensity of connections between sentiment and metrical projections first forged, and then undermined, coherent curves or resolute, calculated publics. The surplus affects generated by metrical practices displaced the ability of public health efforts to accomplish their primary goals of generating safe responses. These might be called 'viral' potencies of the metrics in the sense that their real effects spread of their own accord, whether in motivating commitment to vaccines and masking or, conversely, refusing these practices on grounds that were untrustworthy. These unanticipated effects were a consequence of the excesses of metrical representations as much as they were an effect of their rationality.

Metrical Erasures

Descriptive metrics used to count case loads and death rates of COVID-19, along with the predictive metrics that warned of mass mortalities, distilled the story of the pandemic as being primarily about a deadly virus on the move. This viral narrative, however, displaced or effaced other stories that underpinned COVID-19's pathology. SARS CoV-2 was not an indiscriminate agent. As many anthropologists have noted (Manderson, Burke, and Wahlberg. 202; Oliveira and Aguiar Arantes 2020), some communities were more at risk of both contracting and dying from it than others. Moreover, the metrics that focused on viral movements had a hard time tracking those aspects of the pandemic that did not behave like a typical virus, including those whose experience of COVID-19 persisted. What stories might have been told had the metrics focused on, or included, these confounding factors?

Consider the non-story of New York City—ground zero for the opening wave of the US pandemic, where the viral metrics could have changed the modeling arc. In that city, as elsewhere across the country, the chronically high and maldistributed burden of comorbidities shaped viral outcomes. As SARS-CoV-2 became the narrative organizer for mortality, death was channeled through the pandemic narrative, with its accelerated timeline, its need for an Aristotelian arc that made it time-limited, with a beginning-middle-and end, appearing as a 'new' burden of illness (and mortality) that was constituted as unacceptable. The viral agent took over as the lead actor because it, in some sense, fit with the viral pandemic version of how this mortality was caused. What was effaced in this narrative was the story about the production of co-morbidities that actually underpinned higher death rates, the toxic foods and chemical

exposures, the racism baked into the US health care system at every level— all of which have

contributed to a long and steady state of debilitation and slow death (Livingston 2020). Rising

slowly, creeping up over so many decades, the counting of co-morbidities and their causes

became normalized as static variables rather than as causal of morbidity in and of themselves

(Adams 2020; Caduff 2020).

The organization of data into globally and regionally comparative sets meant to signal

rising and falling rates of peril and burdens of loss in a given jurisdiction—scalar operations that

effaced the hierarchies of risk and disposibility of its population. Risk factors that were tied to

social inequalities remained largely invisible in the daily accounting of morbidity and deaths that

circulated as policy-making instruments. For example, the daily accounted figure of hospital

deaths through which New York was compared to Chicago or Little Rock or Milan, obscured the

maldistribution of hospital mortality within the city. Some chronically under-resourced hospitals

in neighborhoods that were home to disproportionate numbers of "essential workers" had much

higher mortality rates than more capitalized hospitals in wealthier neighborhoods as emerged in

the press. In the publicly reported metrics also, morbidities of so-called "essential workers" who

were unable to quarantine were lumped in with those whose morbidities were a consequence of

other risk exposures (Livingston 2022). What if the numbers had focused on how these

subpopulations were over-exposed to the virus in relation to basic social inequalities of labor and

wealth? How might our ability to understand the pandemic, and to generate effective responses,

have been different if our counting practices had offered more subtle distinctions based on the

social contours of risk that preceed and outlive the virus?

It is true that eventually some efforts were made to locate high risk populations in

residential institutions. Specifically, nursing home cases and deaths were counted alongside

those in city jails and state prisons. A portion of the pandemic was now metrically and materially sealed off from the general public in these institutions. Visiting was suspended to either kind of institution, and relatives worried from a distance, imagining worst case stories spun from the metrics. Despite their radically different positions vis a vis one another, staff and elderly nursing home residents; guards and incarcerated persons, shared in the high rates of infection and carry the taint of social death. The sealing off of metrics into institutional sub-epidemics here glossed crass questions and equally crass answers. Once we had the numbers, did this counting lead to efforts to improve conditions of living at such places? No, they too were wrapped around the narrative of viral exposure, and questions about whether a death in a nursing home *counted* the same as death among the "general" public were raised.

The metrics of COVID-19 used by epidemiologists did eventually try to isolate key variables or expressions for quantification, to examine factors in isolation and then in modeled, abstract combinations. But the modeling of the pandemic as singular *event*, albeit a highly complex and multifactoral one built out of big, dynamic, and complex data sets, bounded the story of the pandemic from bigger story of disaster in which it sat. Suspended from the narrative, or relegated to its margins, was the refugee crisis that months before SARS-CoV-2 had been the subject of much metricization, even as the pandemic demonstrated that it was the air travel of the wealthy and not the rubber boats of the poor and displaced that spread disease and economic turmoil. The fires, the hurricanes, the plastic-choked oceans, and the sixth extinction were held off stage as causal relations of the pandemic death march. The viral narrative could not hold simultaneously damning evidence of bleach, the cleaning chemicals, the thousands upon thousands of tons of disposable everything whose availability was suddenly all the more important for safety than harm, metricized as proxies for political efficacy. The stock market

ticker tape and the metrics of death and devastation continued to diverge, lurching forward toward the uptick in corporate profits on the mere premise (with no actual evidence) of things like vaccines.

The metrics of COVID-19 thus operated as instruments that concealed some realities while conjuring others as acts of artifice, driving forward the industrial complex of free-market competitors perched to 'rescue' populations under the rubric of emergency spending and social lockdowns, while simultaneously making it harder to see how transmission dovetailed pre-existing health and existential risk. What was missed in all this counting, however, were the emerging realities that did not fit the disaster event narrative form. Consider the multitudes of those whose symptoms of COVID-19 lingered, whose experience of the virus was chronic rather than acute.

For those with what became named 'long COVID,' navigating the experience of the coronavirus required wading through metrical indicators that were most often shown as either cases or deaths, initially leaving such patients unaccounted. The quest for 'true' numbers required deciphering uncertainties produced through testing technologies, sampling strategies and attribution of fatalities to the virus. While abstract, opulation level statistical questions were instructive to individuals with symptoms hoping to understand and anticipate the effects of the virus as an embodied experience. What did it mean to become a 'case,' and how might one anticipate becoming a 'death'? The conferring of a disease label, traditionally understood to enable access to both information—about the trajectory and ways to manage a disease— and treatment, were confounded by the sea of metrics that circulated already. The first challenges for many with symptoms was in accessing such a disease label, not only because the testing rules were uncertain but also because testing was unreliable, especially for those whose symptoms

exceeded the 14-day expected symptom window. Symptomatic people were consistently turned away by health care services, left without the information or treatment they hoped to receive (see Callard 2020; Greenhalgh et al 2020).

The self-diagnosed soon became a sizable proportion of COVID-19 'cases,' joining those with official diagnoses who turned to online technologies to decipher their experience and produce collective knowledge in a manner familiar from patient experiences of other "contested illnesses" (Dumes 2019; Rogers 2022; Murphy 2006). Online forums for people experiencing COVID-19 appeared on Facebook, Slack and other online community platforms early on in the pandemic and quickly accumulated thousands of members from all around the world. Reports of alarming pulmonary, heart and neurological symptoms, among other things, began to float across the internet as people with symptoms tried to make sense of their lives. The COVID-19 Body Politic Slack Group (2020), for instance, polled 640 respondents at the end of April 2020 at a point when symptoms for most respondents were ongoing, averaging 40 days according to its survey. Sharing experiences to cross-check their own status, to seek reassurance and gain support for deciphering medical systems, members collectively formulated a metrical image of the disease that differed from those offered by medical experts. Members crowd-sourced data to create their own epidemiological analyses of the nature and trajectories of symptoms. Both of these dimensions—visceral and temporal—were notably encountered, narrated and calibrated through crowdsourced metrics.

Here, too, we call attention to the way that the viral narrative that was used in most circulating metrics of COVID morbidity and mortality—those that presented it as a once in a century event that would be conquered by vaccines and good behavior—made it hard to hear those whose experience of the disease did not fit the mold of the time-limited event. Like the

2

chronic morbidities that were treated as 'static' in the figuration of the virus's ebb and flow but not really counted, those whose experience of COVID-19 did not subside after the prescribed prognosis found themselves neglected. In order to be seen, they had to bootstrap their own metrics and force their experiences into public visibility. The metrics here, too, co-constituted the pandemic and also the experience of it.

Coda

On May 5, 2023, the World Health Organization declared an end to the Global Public Health Emergency, three years after the SARS C0V 2 virus appeared on the viral radar of epidemiologists, and even though the death toll of nearly 7 million people was still slowly increasing. Looking back, it would be hard to deny that the COVID-19 pandemic was a once-in-a-century event. To what degree that exceptionality was a feature of the virus's trajectory across populations and place and to what extent it was an artifact of the metrical storm through which the pandemic made landfall is now impossible to decipher. The coronavirus remains a total social fact—a tangled nexus of metrical and viral information, of political calculation and public affect, organizing and orchestrating new global realities.

By reflecting on some of the metrics of COVID-19 in relation to their power, their affective potencies and their narrative opportunities, misdirections and erasures, we have tried to focus on several possibilities—their co-constitution of the pandemic in conversation with the virus; their ability to craft affects and engage the public in ways that cannot be contained; their forging of narrative arcs that tell some stories while excluding others. Our hope is that by

interrogating the pandemic in this way, we have also added more to the anthropological analysis of the way metrics work in our pandemic times. Pandemic metrics persist, haunting the present, waiting to offer prognostications of return or of an altogether new outbreak. At a minimum, we suggest that a critical interrogation of the metrics at work in the COVID-19 pandemic makes it clear that the experience of COVID-19 was as much an experience of the metrics as it was of the virus.

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A Pandemic of Metrics

In short, models and simulations cut across boundaries of pure categories we accept in science, and sometimes politics. Some people might be tempted to see the compromises that models make — between the domains of the theoretical and the material, between their uses as pragmatic and representational objects, between different goals — as unsatisfactory, to see it as simple inconsistency or imperfection. But we might choose instead to see models and simulations as monsters necessary to mediate between worlds that cannot stand on their own, or that are unmanageable.

– Sergio Sismondo 1999

The experience of COVID-19 got many ethnographers thinking and writing in new ways about the metrics and the metrical infrastructures that animate public health interventions (e.g., Anderson, 2021; Block et al., 2020; Bermant, Soto and Ssorin-Chaikov, 2020; Breslin et al. 2022; Christin, 2020; Jones and Helmriech, 2020). This was, in no small part, because the work of rendering the COVID-19 pandemic visible far exceeded the rationalities of quantitative calculation. The proliferation of metrics within a situation of radical contingency turned many into amateur epidemiologists, looking to 'the numbers' to provide a compass to social and professional engagements, and to calculate the chances for their survival and those of loved ones. Numbers presented in graphs, tables and maps as metrical figurations also created footholds for

finding fault with political systems and for imagining collective economic futures. It is precisely because the metrics in these moments were so salient—because so many reached for them desperately—that their promise and power continues to demand scrutiny. Here, we offer a critical reflection on the way metrics co-created the COVID pandemic and its afterlives, asking: How did metrics, as artifacts with peculiar and particular capacities, transform a virus into what might be called *a pandemic of metrics?*

Long before SARS-CoV-2, metrical figurations were quietly creating the conditions for the distillation of uncertain biological phenomena into *pandemics*. The scale and pace of infectious disease outbreaks are a feature of our contemporary predicament. Environmental degregation, rapid urbanization, mass migration, and climate change have created the conditions for viruses and bacteria to mutate, jump species and amplify within human populations (Brown and Kelly, 2014). Predictive epidemiological and infectious disease sciences have rendered those crescendos of pathogenic interactivity as 'wave-like' (Jones and Helmriech, 2020), offering prophetic messages about the inevitability of 'the next one' (Caduff, 2015). Metrics have also set in motion a looming recursivity in which viruses like SARS-CoV-2 are sutured to market-driven preparedness agendas and reinvigorated protectionist policies, creating crises we can never really shake off (Erikson, 2015; Wraith and Stephenson, 2009). "Like infectious agents on an agar plate," Greene and Vargha write, pandemics "colonize our social lives and force us to learn to live with them, in some way or another, for the foreseeable future"(2020, 22). We would add that this power is animated by metrics and their capacity to create a new calculus of vulnerabilities as clusters of socioeconomic precarity emerge and endure (Benton, 2015; Ticktin, 2020).

The term 'metrics' is used in population health to denote a wide variety of quantitative measuring and emplotment processes. Metrics are never simply available in the 'real' world;

they have to be composed using available means of quantitatively 'reading' the world. They can be many different things, from standard measures and benchmarks to big data sets, models and actuarial estimates, all performing different operations in different epistemic spaces. Metrics carry performative power, derived in part from their ability to help experts manage the unknown in ways that are (at least statistically) reliable. Metrical practices do this by stabilizing the complexity of lived social worlds, turning transient and situationally contingent phenomena into obdurate, reductive and comparable data through modes of counting, modeling practices, algorithmic emplotment, and statistical evaluations. Variously represented in graphs, charts, equations and diagrams, metrics are potent because they are scalar (able to move from small samples to populations, for instance) and because they can be tested for validity.

It is precisely these powers that compel anthropological critique. In this effort, we join scholars who have revealed the stakes of metrical reasoning and praxis, showing how metrics can distort perceptions of the world both by excluding information and by constituting new realities through commodifying, objectifying and essentializing social realities (e.g., Adams, 2016; Greene, 2009; Erikson, 2019; Reubi, 2018; Sangaramoorthy and Benton, 2012; Treichler, 1999). We also build upon recent social scientific critiques concerned with the social contingencies of mathematical models and how these quantitive operations themselves can generate novel forms of sociality (e.g. Brown, 2020; Rhodes and Lancaster, 2020, Richardson, 2020). Our goal here is to extend those insights to the metrical assemblage of pandemic life. To that end, we examine how the pandemic of metrics in relation to COVID-19 in the US and the UK worked in at least three ways: 1) as technological enactments that conjured a once in a century pandemic 2) as affective events that produced a manageable, and then an unmanageable,

public: and 3) as instruments that mediated social worlds, even as they closed down opportunities for political accountability.

Undertaking this analysis is not without risks. As conspiracy theories continue to roil government responses to large scale public health crises across the globe, an analysis of the compromises and fetishisms attendant to such quantification could seem inappropriate and inopportune. Still, knowing that metrics are unstable, black-boxed, provisional, and capable of doing harm neither forecloses the debate about their utility nor short-circuits the need for social science analysis. As scholars from the UK and the US, our engagement is particular and situated, relying on an evidentiary field that arises from these two places during the time when COVID-19 predictions were being rolled out with extreme rapidity. We also share a common ethnographic orientation. In various ways and in distinct contexts, our previous work has grappled with the performativity of metrics, particularly the forms of global health attention and neglect they precipitate. COVID-19 produced in us, as medical anthropologists, a real-time collective sense of critical disorientation. We found ourselves affected by, and caring for, metrics in ways that far exceeded our basic recognition of the gap between lived experience and quantitative representation. By exploring metrics in action, we found ourselves convinced of the need to describe how the various metrics of this virus have travelled as objects with revelatory powers enabling the formation of public health solidarities. What we aim for here is a modest yet resolutely critical stance—one that takes metrics seriously as socially vital technologies, necessary monsters we should not ignore (Sismondo, 1999).

Metrical Cohesion of the Pandemic Before it Was

To tell the story of COVID-19's metrical existence, one could start with mid-20th century

efforts to map viral and bacterial outbreaks (Lakoff and Collier, 2008). In the US, this history

begins in 1951, when the newly formed Centers for Disease Control (CDC) deployed a team of

epidemiologists to find the cause behind case reports of headaches, nausea and fatal hemorrhage

among American troops in Korea (Duhigg, 2020). Their success—tracing the outbreak to rat

feces, and not a bioterrorist plot (as initially suspected)—led to the institutionalization of

epidemiology as a special division at the CDC, the Epidemic Intelligence Service (EIS),

replicating for public health what had been created for geopolitical security in the US federal

government's Central Intelligence Agency.

The fortunes of the EIS waxed and waned over the second half of the 20th Century, but its

power was bolstered in the 1990s, as the HIV/AIDS pandemic prompted a shift in funds from

primary health care back toward infectious disease control—a move, which as Treichler (1999)

suggests, built upon and entrenched dominant discourses of risk and blame. In 1996, The CDC

created a surveillance system called BioSense to detect emerging epidemics, largely focused on

the US and Europe (Fearnley, 2008). BioSense inaugurated a new paradigm in public health, one

directed towards deciphering syndromic patterns (respiratory and gastrointestinal arrays of

symptoms) and detecting alterations, augmentations, and explosions of those patterns, rather than

simply counting infection rates and deaths. Its purpose was to create a predictive apparatus that

could see outbreaks coming. Narratives of 'the coming pandemic' were also strengthened by

popular accounts that traced the progression from HIV and multi-drug-resistant tuberculosis to

socio-political and environmental changes occurring on a global scale (e.g. Garrett, 1994).

In first two decades of the new millennium—the global health era—the emergence of

Ebola, SARS and MERS along with increasingly potent strains of influenza (Swine Flu, H1N1)

granted greater authoritative weight to models that could predict the path of outbreaks. Treatment

and mitigation efforts increasingly gave way to strategies of prophylaxis, drawing resources

away from public health infrastructure and pouring it into surveillance technologies, vaccines,

and forecasting (Lakoff, 2008, 2015; Porter, 2016). At large European and UK institutions, the

focus was on stockpiling antiviral drugs, heightening regulation of laboratories, building

surveillance technologies, and planning and conducting preparedness exercises (Bingham and

Hinchliffe, 2008; Kirchhelle, 2022; Rosner and Markowitz, 2006). In other places, massive

populations of livestock and poultry were summarily culled to prevent possibility of viral spread

(Hickler 2010). The move away from identifiable pathogenic risks to anticipated pathogenic

potentials further entailed collapsing temporal fields of operation: bringing the future to the

present (Adams, Murphy and Clarke, 2009), while also augmenting the militarization of public

health (Masco, 2014).

The shift to prediction fostered new communities of inquiry in global health. Infectious

disease MDs, pathologists, virologists and zoonosis experts teamed up with emergency

responsiveness experts, financial analysts and epidemiologists to map the viral future using ever

more sophisticated metrics. These new metrics focused less on case data (evidence of what was

already known) and more on the designation of sentinel figures (devices, animals, early human

cases) that signaled risky futures prior to actual outbreaks, as well as on the rationales for

investment (financial risk, win-win scenarios and cost effectiveness strategies) (Lakoff, 2015;

Lachenal, 2015; Erikson and Johnson, 2020). In 2005, the WHO called upon its Emergency

Committee to create a centralized governance infrastructure for coordinating epidemic response

with "sole power to declare the beginnings and endings of Public Health Emergencies of

International Concern (PHEIC)" (Greene and Vargha 2020). In the US, virologist Dennis Carroll

formed a pandemic-threats unit at the U.S. Agency for International Development called

PREDICT "to support discovery of potentially dangerous new viruses before they spill over into

humans" (Quammen, 2020). As experts liked to say in high profile venues from Davos to TED

talks (in words echoed by politicians), it was not a matter of *if,* but rather *when*, the next

pandemic outbreak would appear (e.g., Lakoff, 2008:34; Osterholm et al., 2015, Cooper, 2006).

This certainty was grounded in metrical knowledge.

One metric used by the Institute for Health Metrics Evaluation (IHME), was built from

templates designed at Imperial College London for modeling infectious disease outbreak and

spread as well as predictive mortality. These so-called "SIR-type" instruments took into account

Suspected, Infected and Recovered (SIR) population metrics along with country-specific data,

including social distancing policies, hospitalization rates, and death rates, to forecast the

dynamics of outbreaks in their nascent (pre-pandemic) stages complete with early indicators of

numbers of infections and deaths (Walker et.al. 2020; Fuller 2020). The IHME used the SIR

design to craft its own modeling system, extrapolating curves from previous SIR models to

create a "curve fitting model" for a range of hypothetical viruses, and to predict their progress in

a population over time (Fuller, 2020).

So how, specifically, did these metrical practices bring the COVID-19 pandemic to life?

On December 2019, in a now familiar story, the spark of recognition of a potential pandemic

materialized when a merchant who worked in a local wet-market presented with SARS-like

symptoms to a clinic in Wuhan, China. Over the next weeks, laboratory experts would decipher

from this man's sputum, and a cluster of other sputum samples from other Chinese patients,

evidence of a novel coronavirus, 2019-nCoV, now known as SARS-CoV-2, which causes the disease now colloquially known as COVID-19.

China's viral experts, who had been trained by US pandemic experts, were in communication with the US CDC about the outbreak. Information about the novel virus moved quickly into the airways of pandemic preparedness (Wu and McGoogan, 2020). Public and academic accounts of the events establish the following timeline: one week after China's experts sequenced the novel virus, a Seattle-baed, EIS trained infectious disease expert named Francis Reido was alerted to a 35-year-old male patient who arrived at an urgent care clinic with a four day-old cough and fever (Duhigg, 2020; Holshue, et al., 2020). His case might have been unremarkable (indeed he was sent home after leaving some swab samples), but for one thing: he had just returned to Seattle from visiting relatives in Wuhan. The patient reported that he had seen the US CDC's health alert about the outbreak in China and thus felt he should go to the clinic. This disclosure prompted his physician to call to Reido, who immediately alerted his team of EIS-trained colleagues around the world.

Reido guessed that the virus might already be more widely spread. To test his hunch, he randomly selected and tested two other patients in the Seattle area who had similar symptoms. One tested positive as a match for SARS-CoV-2. Reido raised alarm bells about this second case because it was someone who had no recent history of travel to China nor obvious connection to anyone with such a history. His colleagues then turned up an additional fourteen cases of SARS-CoV-2 seropositivity in the US, some with full blown symptoms of Covid-19 (Duhigg, 2020). Samples of the novel virus were sent to global institutions in Hong Kong, Berlin, Atlanta, and Hamburg, where scientists developed various diagnostic tools that could be used to detect it (Wu,

F. et al., 2020). By January 30th, 9976 cases were ascertained in 21 countries, including China and the US (Holshue et al., 2020).

It is worth noting that the mere identification of a novel coronavirus was not enough, in and of itself, to establish a pandemic. New viruses emerge all the time and spread globally at rates higher than those of SARS-CoV-2 at the time these data were collected. Yet only a few weeks later, when Italy had experienced only one death from COVID-19 and Iran only ten, Bill Gates was already publicly calling COVID-19 a "once in a century pandemic" (Gates, 2020). What motivated this description was not the high infection or disease counts, but rather the predictions that IHME's algorithms were generating. The IHME models painted a very frightening picture, affirming that SARS-CoV-2 would indeed cause a 'once in a century' pandemic that, if their metrical figuring was correct, would swiftly overwhelm hospitals and kill multitudes.

The facts about SARS-CoV-2 had their own agency, but they also needed to be catapulted from empirical platforms into public circulation. They needed footholds to propel them forward. They required 'once-in a century' metrical figuring—the kind offered by IMHE—that could weigh in and cut through the competing and tension-filled debates over how dangerous the virus really was. Projections of how the virus was likely to behave varied among competing models and the sociopolitical contingencies that made some models more likely to be taken seriously than others. The IHME model settled that mystery over contagion and turned SARS-CoV-2 into a public health emergency of international concern, boot-strapping an archipelago of cases into an anticipated global explosion of infection that demanded mass mobilization and response in the present.

We do not mean to suggest that the viral risk was not acutely real. COVID-19 caused (and indeed, continues to cause) tremendous suffering and death, undoubtedly more than has been actually counted (Sun and Achenbach 2020). Had nations not responded with the measures they did, mortality might likely have been immeasurably greater. What we are saying is that the COVID-19 pandemic that came into existence as a public health and political event could only have occurred because of the anticipatory metrical practices that were used to transform SARS-CoV-2 from a viral possibility into a matter of global health concern, and further that this configuration of a pathogenic problem delimits a very narrow and singular set of responses, experiences and potential solutions under the sign of the "once in a century pandemic."

Algorithms Make Affected Publics and Then Disperse Them

COVID-19's "once in a century" trajectory was brought forth through algorithms. An algorithm is a pre-defined operation to answer a specific problem—in the mathematical lexicon, it is an *effective* method. Through arithmetic rules and finite parameters, algorithms speak to the future, projecting scenarios that tether an eventuality to concrete actions and actualities, "clos[ing] down unknowns into a governable present" and setting up a direction for action (Rhodes, Lancaster and Rosengarten, 2020).

That power to adjudicate decisions, to intervene, to *effect* lives and livelihoods, is fueled by a heady combination of objectivity and obscurity (Ziewitz, 2016; Erikson, 2015; Kolkman and Kemper, 2017; Dixon and Chandler, 2019). In situations of crisis, where conventional forms of expertise and governance are stretched and where data is thin on the ground, algorithmic

analyses offer a way to manage uncertainty, through axiomatic, if not highly imaginative, metrical thinking. The COVID-19 pandemic was called a 'Black swan event,' an event that demands speculative and creative modes of response—a way of thinking forward, according to Osterholm et.al. (2015) ,"which is ultimately aimed at securing our collective future." The power of algorithms like those used by the IHME or the SIR models is not simply in their ability to harness predictable certainty from a series of unknowns, but also in their ability to shape affective responses. These affective powers reside in the way images of algorithmic predictions can be presented as graphs, charts, and tables that render a certainty out of a sea of competing facts. As Michelle Murphy suggests, such visual simplifications "purposively push aside complex reactivity" (see Murphy, 2017).

Over and above their empirical basis, graphic presentations of algorithmic models have a visceral appeal, particularly when conveyed in easily readable form. The unique communicative power of the epidemic curve is a graphical referent for the anticipated experience of disaster. For COVID-19, the most commonly seen algorithmic projections were 'hockey-stick' projections—borrowing from the grammar of climate science (Demeritt, 2006). They indexed exponential growth, irreversible acceleration from disparate points of contagious contingency. A iconic form of 'pandemic prophecy,' these projections articulated an eschatological structure of feeling—the nightmare of wild and unfettered contagion capable of catalyzing global response (Caduff, 2015; Sampson, 2012).

The gradient of COVID's curve commanded this kind of negative aesthetic charisma (Lorimer, 2007). As Neil Ferguson, a prominent Imperial College London epidemiologist who would become a central figure in the UK COVID-19 response, put it: the images help us "…to wake up the world and say that this could be really bad if we don't do anything" (The

Economist, 2015). The fact that predictions could be off by millions (as some were, for instance, with the 2014-2016 West African Ebola Outbreak), or not yet actual (as in the case of COVID-19), did not undercut the authority of the hockey stick image. The curve belongs to the future anterior. Its appalling upward slope communicates what we need to do to avert the disaster it fortells: flattening the upward climb into a rounded curve downward.

In the early days of the COVID-19 outbreak in the UK, the algorithmically derived curve functioned in this way—an epidemiological prophecy that by igniting panic, animated new publics seeing themselves reflected in and subjected to viral communicability (Briggs 2022). "This is a national endeavor," Matt Hancock, then the embattled UK Heath Secretary, told the UK public during one daily Covid briefing. "And whatever the headwinds, as a country we can't let up on this. We are past the peak. We're flattening the curve. We protected the NHS and the number of deaths is falling. We must keep our resolve" (West Bridgford Wire, 2020). It was not without some irony that this briefing built around metrical persuasion coincided with the day that Public Health England stopped performing contact tracing as infections overwhelmed surveillance capacities.

Figure 1: "Number Theater"

To reduce the gradient from hockey stick to gently-sloping rise and fall, the public would have to be motivated—indeed impassioned—to play their role. And yet, the dissonance between the clarion call for civic spirit and the graphic form that patriotism took under COVID-19 was

jarring, not just for the political content of the message but for its imaginative leap in transforming individual compliance into collective sentiment—an expression of belonging, compassion and concern anchored in the figurative power of the curve. Tantamount to what David Speigelhalter, the UK Government's chief advisory statistician, termed "number theatre," the Prime Minister's daily coronavirus briefings did not operate within the province of fact; with unreliable diagnostics, uncertain case definitions and an overwhelmed contact tracing system that had ground to a halt, pronouncements about the precise scale or scope of transmission could only ever be graphically gestural. The infographics conveyed, if not statistical reason, a form of policy rationale: a cruel kind of optimism, in Berlant's (2011) terms, making sense of the price we must pay to secure our hopes for a normal future.

Those hopes were played upon and played out in a series of infographics, which smoothed the curve's charisma into a gentle downward slope to normalcy. Fueled by fears about the future, the curve served as an idiom for collective distress and a rationale for personal sacrifice and social (in)action. But as the pandemic progressed, the variety of experiences of living with and through COVID-19 departed from and competed with the singular narrative the curve relayed. Many people were simply overwhelmed by the ubiquity of metrics, as numbers proliferated with an intensity and many developed an infectious sense of obligation to watch and read them, to calibrate upticks and downticks to personal logics of risk, when to travel, whom to see, whether or not to wear masks.

Figure 2: Curve Logics and Lifestyles

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The metrics themselves became messy and contradictory, with curves, surges, and scales that became difficult to pay attention to, let alone to comprehend (Bickerstraff and Simmons, 2003; Lenzer and Brownlee, 2020; Jones & Helmriech 2020). They did not settle, and as experts engaged in public arguments over how to count, predict and mitigate COVID-19, public suspicion, cynicism and doubt grew. Debates between epidemiologists and infectious disease experts produced different modes of representing the viral threat, with one focusing on infectivity and spread and the other on how to count morbidities and deaths (and when not to count them as COVID deaths). Clinical epidemiologists like John Iaonnidis (2020), argued against the hockey stick models on that grounds that they were not evidence-based. According to Ioannidis even though quarantine measures were advisable, the assumption of an unprecedented high mortality pandemic was putting the cart before the horse (Fuller, 2020). Mechanistic models were set against forecasting models, with one side focusing on predictions based on mechanisms of spread and pathology and the other on projections based on previous epidemic outbreaks (Holmdahl and Buckee 2020). Different kinds of futures were proposed from country to country, with different countries using different metrical tactics to calibrate national concerns. The IHME models used in the US were designed specifically to forecast death rates and hospitalization demand, but they did not take into account variation in mechanisms of transmission or how these mechanisms would alter rates, as the more mechanistic UK models did (Eker, 2020).

The metrics of COVID-19 were presented to publics in the form of predictive trends, counts of deaths and morbidity rates, and maps of danger zones. Such presentations, however provisional, conjured a continuity between the metrical images (the hockey sticks and flattened curves) and the public. These presentations assumed that the public could be counted on to act with obedience, to move between the contagious crowd—the immunogenic herd—and the

responsive political collective (Mazzarella, 2010, see also Napier, 2020). Here, too, the passage

point that would allow the metrics to be transformed into public responsiveness was affect;

metrics forged a common perception among publics who could move that behavioral wave. The

problem, however, was that, as Mazzarella (2010) notes, the public was not a crowd; it was a

multitude—a vital multiplicity of autonomously responsive beings, not a lifeless, mediated

collective. The publics who were watching those curves were neither uniform nor uniformly

affected by the beauty or horror of these representational practices, nor did they respond

homogenously.

As the authority of epidemiological forecasting wobbled under the diversity of those

experiences, agonistic public sentiment, both in the UK and the US, increasingly revealed itself

as a force in pandemic reckoning. As case fatalities increased the rhetoric of "flattening the

curve" lost its moral force—attenuated by the blatant disregard of it on the part of government

officials and technocrats who flouted the rules that algorithms had been used to put in place.

Rather than a probablable future, algorithms were used to reflect those failures, providing a

counterfactual account of the present, based on projections of what could have occurred in the

past. In his testimony before Parliament after the first wave, Ferguson reprised his reliance on the

prophetic powers of the algorithm, now as Cassandra: "the epidemic was doubling every three to

four days before lockdown interventions were introduced. So had we introduced lockdown

measures a week earlier, we would have then reduced the final death toll by at least a half".[1]

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[1] Evidence given at the House of Lords Science and Technology Committee, 10 am on Tuesday June 2nd, 2020 on the role of modelling in the UK Response. For full session see: https://www.parliament.uk/business/lords/media-centre/house-of-lords-media-notices/2020/may-20/covid19-the-role-of-modelling-in-uk-response-/https://www.parliamentlive.tv/Search?Keywords=Niel+Ferguson&Member=&MemberId=&House=&Business=&Start=05%2F06%2F2020&End=11%2F06%2F2020

Algorithmic metrics are propelled by this paradox: if the projection is heeded, then the event-as-forecasted does not come to be. As an artefact of government failure, the curve would summon anger. Rather than provide fuel for a future that might materialize, the curve generated mourning for a situation that might never have occurred. Public feelings drove complex and contradictory responses to algorithmic predictions, creating feedback loops inside the metrics themselves, as publics became increasingly skeptical of containment measures, influencing transmission trajectories. In her analysis of online COVID conspiracy theories, Renee DiResta (2020) pointed to the powers of social media platforms to facilitate questionable content promotion, facilitate rumors and spread misinformation. The sheer volume of social media content breeds what she has termed "inadvertent algorithmic amplification" or 'infodemics' that recursively fed upon their own logics, forging connections that eluded and confounded efforts at regulation (DiResta 2021, see also, Cinelli et al., 2020; Stalcup, 2020). An overreliance on the metrics, coupled with a failure to communicate their limations, had the effect of generating mistrust among members of the public. Increaseingly rarefied disciplinary debates over which transmission models were *more accurate* had the effect of discounting all models and thereby the very real risks of infection.

As new contours of viral effects were being mapped, displacing older models of morbidity and mortality, few questioned the fact that none of these models could be tested, even by their own standards. An accurate assessment of the reliability of models demands an understanding of the true prevalence of the virus—a fact that was (and remains) unknown because of the prevalence of asymptomatic cases and the broad limits of testing and reporting. That epistemic uncertainty, utterly fundamental to the metrical appearance of the COVID-19 pandemic, was persistently overlooked. Regardless, the pandemic was affirmed over and over

again by the metrics because the metrics had already become the means by which the pandemic was made 'real.' Public audiences conferred on the metrics their power to do/or make what the audiences (and planners) wanted or needed through forms of biomediatization (Briggs, 2022).

Unreported cases of COVID-19 continued to hover at the edges of epidemiological accounting, not only because some nations did not count their cases, but also because even in places where counting was happening, reporting was not mandatory, making any statistical management of the virus problematic. We will never know COVID-19's deadliness in relation to its infectivity rate, because we cannot account for the many people who actually had the virus and recovered without reporting it, even when it was symptomatic. Such obvious gaps in knowledge made the numbers untrustworthy even to lay observers, weakening the ability of the metrics to govern uniform public responses.

Metrics, in other words, in their unruliness and uncertainty, brought about a pandemic that could not be affectively contained. The surplus feeling generated by metrical practices displaced the ability of public health efforts to accomplish their primary goals of generating safe responses. These might be called 'viral' potencies of the metrics in the sense that their real effects spread of their own accord, whether in motivating commitment to vaccines and masking or, conversely, supporting refusal of these practices on grounds that were untrustworthy. These unanticipated effects were a consequence of the excesses of metrical representations as much as they were an effect of the metrics' rationality.

Metrical Erasures

Descriptive metrics used to count case loads and death rates of COVID-19, along with the predictive metrics that warned of mass mortalities, distilled the story of the pandemic into one about a deadly virus on the move. This viral narrative, however, effaced other stories that offered a more complex accounting of COVID-19's pathology. SARS-CoV-2 was not an indiscriminate agent. As many anthropologists have noted (Manderson, Burke, and Wahlberg, 2021; Oliveira and Aguiar Arantes, 2020), some communities were more at risk of both contracting and dying from it than others. Moreover, the metrics that focused on viral movements had a hard time tracking those aspects of SARS-CoV-2 that did not behave like a typical virus, including those whose experience of COVID-19 persisted. What stories might have been told had the metrics focused on, or included, these confounding factors?

Consider the non-story of New York City— which for many weeks in the northern spring of 2020 was the epicenter of the global pandemic. In that city, as elsewhere across the country, a chronically high and maldistributed burden of comorbidities shaped viral outcomes. Yet, as SARS-CoV-2 became the overwhelming object of epidemiological focus, any accounting for the complexity of multimorbidity and its underlying web of causation was foreclosed. The viral agent took over as the lead actor because in the pandemic narrative, all excess mortality was tied to the spread of the novel viral pathogen. What was effaced in this narrative was the story about the production of co-morbidities that actually underpinned higher death rates, the toxic foods and chemical exposures, the racism baked into the US health care system at every level— all of which have contributed to a long and steady state of debilitation and slow death (Livingston, 2020). Rising slowly, creeping up over so many decades, the counting of co-morbidities and their causes became normalized as static variables rather than as causal of morbidity in and of themselves (Adams, 2020; Caduff, 2020).

The organization of data into globally and regionally comparative sets meant to signal rising and falling rates of peril and burdens of loss in a given city, province, or nation formed scalar operations that effaced the hierarchies of risk and disposibility within any given population. Risk factors that were tied to social inequalities remained largely invisible in the daily accounting of morbidity and deaths that circulated as policy-making instruments. For example, the daily accounted figure of hospital deaths through which New York was compared to Chicago or Little Rock or Milan, obscured the maldistribution of hospital mortality within the city. Some chronically under-resourced hospitals in neighborhoods that were home to disproportionate numbers of "essential workers" had much higher mortality rates than more capitalized hospitals in wealthier neighborhoods. In the publicly reported metrics also, morbidities of so-called "essential workers" who were unable to quarantine were lumped in with those whose morbidities were a consequence of other risk exposures (Livingston 2022). What if the numbers had focused on how these subpopulations were over-exposed to the virus in relation to basic social inequalities of labor and wealth? How might our ability to understand the pandemic, and to generate effective responses, have been different if our counting practices had offered more subtle distinctions based on the social contours of risk that preceed and outlive the virus?

It is true that eventually some efforts were made to locate high risk populations in residential institutions. Specifically, nursing home cases and deaths were counted alongside those in city jails and state prisons. A portion of the pandemic was now metrically and materially sealed off from the general public in these institutions. Visiting was suspended to either kind of institution, and relatives worried from a distance, imagining worst case stories spun from the metrics. Despite their radically different positions vis a vis one another, staff and elderly nursing

home residents; guards and incarcerated persons, shared in the high rates of infection and carried the taint of social death. The sealing off of metrics into institutional sub-epidemics here glossed crass questions and equally crass answers. Once we had the numbers, did this counting lead to efforts to improve conditions of living at such places? No. They too were wrapped around the narrative of viral exposure, and questions about whether a death in a nursing home *counted* the same as death among the "general" public.

Epidemiologists did eventually try to isolate key variables or expressions for quantification, to examine factors in isolation and then in modeled, abstract combinations. But the modeling of the pandemic as singular *event*, albeit a highly complex and multifactoral one built out of big, dynamic, and complex data sets, bounded the story of the pandemic from the bigger story of disaster in which it sat. Suspended from the narrative, or relegated to its margins, was the refugee crisis that months before SARS-CoV-2 had been the subject of much metricization, even as the pandemic demonstrated that it was the air travel of the wealthy and not the rubber boats of the poor and displaced that spread disease and economic turmoil. The fires, the hurricanes, the plastic-choked oceans, and the sixth extinction were held off stage as causal relations of the pandemic death march. The viral narrative could not hold simultaneously damning evidence of bleach, the cleaning chemicals, the thousands upon thousands of tons of disposable everything whose availability was suddenly all the more important for safety than harm, metricized as proxies for political efficacy. The stock market ticker tape and the metrics of death and devastation continued to diverge, lurching forward toward the uptick in corporate profits on the mere premise (with no actual evidence) that technical tools like vaccines were just around the corner.

The metrics of COVID-19 thus operated as instruments that concealed some realities while conjuring others as acts of artifice, driving forward the industrial complex of free-market competitors perched to 'rescue' populations under the rubric of emergency spending and social lockdowns, while simultaneously making it harder to see how transmission dovetailed with pre-existing health and existential risk. What was missed in all this counting, however, were the emerging realities that did not fit the disaster-event narrative form. Consider the multitudes of those whose symptoms of COVID-19 lingered, whose experience of the virus was chronic rather than acute.

For those with what became named 'long COVID,' navigating their illness required wading through metrical indicators that were most often shown as either cases or deaths, initially leaving such patients unaccounted. The quest for 'true' numbers required deciphering uncertainties produced through testing technologies, sampling strategies and attribution of fatalities to the virus. Though abstract, population level statistical data were instructive to individuals with symptoms hoping to understand and anticipate the effects of the virus as an embodied experience. What did it mean to become a 'case,' and how might one anticipate becoming a 'death'? The conferring of a disease label, traditionally understood to enable access to both information—about the trajectory and ways to manage a disease— and treatment, were confounded by the sea of metrics that circulated already. The first challenge for many with symptoms was in accessing such a disease label, not only because the testing rules were uncertain but also because testing was unreliable, especially for those whose illness exceeded the 14-day expected symptom window. Symptomatic people were consistently turned away by health care services, left without the information or treatment they hoped to receive (see Callard, 2020; Greenhalgh et al., 2020).

The self-diagnosed soon became a sizable proportion of COVID-19 'cases,' joining those with official diagnoses in turning to social media to decipher their experience and produce collective knowledge, including metricized data, in a manner familiar from patient experiences of other "contested illnesses" (Dumes, 2019; Rogers, 2022; Murphy, 2006). Online forums for people experiencing COVID-19 appeared on Facebook, Slack and other online community platforms early on in the pandemic and quickly accumulated thousands of members from all around the world. Reports of alarming pulmonary, heart and neurological symptoms, among other things, began to float across the internet as people with symptoms tried to make sense of their altered bodies and lives. The COVID-19 Body Politic Slack Group (2020), for instance, polled 640 respondents at the end of April 2020 at a point when symptoms for most respondents were ongoing, averaging 40 days according to its survey. Sharing experiences to cross-check their own status, to seek reassurance and gain support for deciphering medical systems, members collectively formulated a metrical image of the disease that differed from those offered by medical experts. Members crowd-sourced data to create their own epidemiological analyses of the nature and trajectories of symptoms. Both of these dimensions—visceral and temporal—were notably encountered, narrated and calibrated through crowdsourced metrics.

Here too, we call attention to the way that the viral narrative that circulating alongside metrics of COVID morbidity and mortality—one that presented it as a once in a century event that would be conquered by vaccines and good behavior—made it hard to hear those whose experience of the disease did not fit the mold of the time-limited event. Like the chronic morbidities that were treated as 'static' in the figuration of the virus's ebb and flow but not really counted, those whose experience of COVID-19 did not subside after the prescribed prognosis found themselves neglected. In order to be seen, they had to bootstrap their own metrics and

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force their experiences into public visibility. The metrics, too, co-constituted the pandemic and the experience of it.

Coda

On May 5, 2023, the World Health Organization declared an end to the Global Public Health Emergency, three years after the SARS C0V 2 virus appeared on the radar of epidemiologists, and even though the death toll of nearly 7 million people continued its (now slower) slow. Looking back, it would be hard to deny that the COVID-19 pandemic was a once-in-a-century event. To what degree that exceptionality was a feature of the virus's trajectory across populations and place and to what extent it was an artifact of the metrical storm through which the pandemic made landfall is now impossible to decipher. The coronavirus remains a total social fact—a tangled nexus of metrical and viral information, of political calculation and public affect, organizing and orchestrating new global realities.

Here we have reflected on some of the metrics of COVID-19 in relation to their affective potencies and their narrative opportunities, misdirections and erasures. In doing so we have tried to focus how metrics co-constituted the pandemic in conversation with the virus as well as the capacity of metrics to engage the public in ways that cannot be contained, and their forging of narrative arcs that tell some stories while excluding others. Our hope is that by interrogating the pandemic in this way, we have also added more to the anthropological analysis of how metrics work in our pandemic times. Pandemic metrics persist, haunting the present, waiting to offer prognostications of return or of an altogether new outbreak. At a minimum, we suggest that a

critical interrogation of the metrics at work in the COVID-19 pandemic makes it clear that the experience of COVID-19 was as much an experience of the metrics as it was of the virus.

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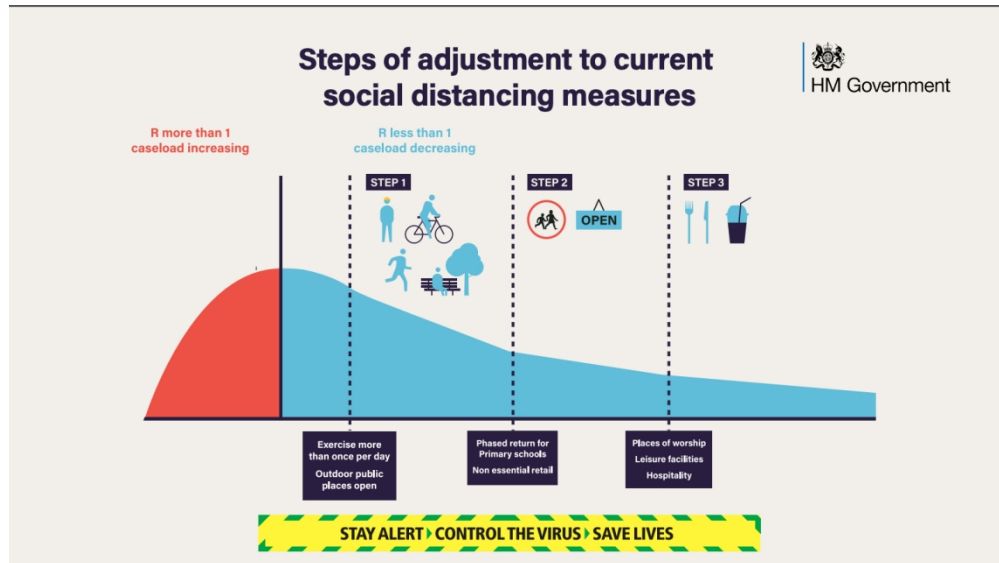Stalcup, Meg. 2020. The Invention of Infodemics: On the Outbreak of Zika and Rumors. *Somatosphere* http://somatosphere.net/2020/infodemics-zika.html/

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Profile of the epidemic under different approaches
Illustrative impact of social and behavioural interventions
lasting several months on a Reasonable Worst Case epidemic

"Number Theatre", Published by UK Government, Press Briefing, 10 Downing Street, March 12, 2020

299x166mm (72 x 72 DPI)

A Pandemic of Metrics

In short, models and simulations cut across boundaries of pure categories we accept in science, and sometimes politics. Some people might be tempted to see the compromises that models make — between the domains of the theoretical and the material, between their uses as pragmatic and representational objects, between different goals — as unsatisfactory, to see it as simple inconsistency or imperfection. But we might choose instead to see models and simulations as monsters necessary to mediate between worlds that cannot stand on their own, or that are unmanageable.

– Sergio Sismondo 1999

The experience of COVID-19 got many ethnographers thinking and writing in new ways about the metrics and the metrical infrastructures that animate public health interventions (e.g., Anderson, 2021; Block et al., 2020; Bermant, Soto and Ssorin-Chaikov, 2020; Breslin et al. 2022; Christin, 2020; Jones and Helmriech, 2020). This was, in no small part, because the work of rendering the COVID-19 pandemic visible far exceeded the rationalities of quantitative calculation. The proliferation of metrics within a situation of radical contingency turned many into amateur epidemiologists, looking to 'the numbers' to provide a compass to social and professional engagements, and to calculate the chances for their survival and those of loved ones. Numbers presented in graphs, tables and maps as metrical figurations also created footholds for

finding fault with political systems and for imagining collective economic futures. It is precisely

because the metrics in these moments were so salient—because so many reached for them

desperately—that their promise and power continues to demand scrutiny. Here, we offer a

critical reflection on the way metrics co-created the COVID pandemic and its afterlives, asking:

How did metrics, as artifacts with peculiar and particular capacities, transform a virus into what

might be called *a pandemic of metrics?*

Long before SARS-CoV-2, metrical figurations were quietly creating the conditions for

the distillation of uncertain biological phenomena into *pandemics*. The scale and pace of

infectious disease outbreaks are a feature of our contemporary predicament. Environmental

degradegation, rapid urbanization, mass migration, and climate change have created the

conditions for viruses and bacteria to mutate, jump species and amplify within human

populations (Brown and Kelly, 2014). Predictive epidemiological and infectious disease sciences

have rendered those crescendos of pathogenic interactivity as 'wave-like' (Jones and Helmriech,

2020), offering prophetic messages about the inevitability of 'the next one' (Caduff, 2015).

Metrics have also set in motion a looming recursivity in which viruses like SARS-CoV-2 are

sutured to market-driven preparedness agendas and reinvigorated protectionist policies, creating

crises we can never really shake off (Erikson, 2015; Wraith and Stephenson, 2009). "Like

infectious agents on an agar plate," Greene and Vargha write, pandemics "colonize our social

lives and force us to learn to live with them, in some way or another, for the foreseeable future"

(2020, 22). We would add that this power is animated by metrics and their capacity to create a

new calculus of vulnerabilities, as clusters of socioeconomic precarity emerge and endure

(Benton, 2015; Ticktin, 2020).

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The term 'metrics' is used in population health to denote a wide variety of quantitative measuring and emplotment processes. Metrics are never simply available in the 'real' world; they have to be composed using available means of quantitatively 'reading' the world. They can be many different things, from standard measures and benchmarks to big data sets, models and actuarial estimates, all performing different operations in different epistemic spaces. Metrics carry performative power, derived in part from their ability to help experts manage the unknown in ways that are (at least statistically) reliable. Metrical practices do this by stabilizing the complexity of lived social worlds, turning transient and situationally contingent phenomena into obdurate, reductive and comparable data through modes of counting, modeling practices, algorithmic emplotment, and statistical evaluations. Variously represented in graphs, charts, equations and diagrams, metrics are potent because they are scalar (able to move from small samples to populations, for instance) and because they can be tested for validity.

It is precisely these powers that compel anthropological critique. In this effort, we join scholars who have revealed the stakes of metrical reasoning and praxis, showing how metrics can distort perceptions of the world both by excluding information and by constituting new realities through commodifying, objectifying and essentializing social realities (e.g., Adams, 2016; Greene, 2009; Erikson, 2019; Reubi, 2018; Sangaramoorthy and Benton, 2012; Treichler, 1999). We also build upon recent social scientific critiques concerned with the social contingencies of mathematical models and how these quantitive operations themselves can generate novel forms of sociality (e.g. Brown, 2020; Rhodes and Lancaster, 2020, Richardson, 2020). Our goal here is to extend those insights to the metrical assemblage of pandemic life. To that end, we examine how the pandemic of metrics in relation to COVID-19 in the US and the UK worked in at least three ways: 1) as technological enactments that conjured a once in a

3

century pandemic; 2) as affective events that produced a manageable, and then an unmanageable, public;- and 3) as instruments that mediated social worlds, even as they closed down opportunities for political accountability.

Undertaking this analysis is not without risks. As conspiracy theories continue to roil government responses to large scale public health crises across the globe, an analysis of the compromises and fetishisms attendant to such quantification could seem inappropriate and inopportune. Still, knowing that metrics are unstable, black-boxed, provisional, and capable of doing harm neither forecloses the debate about their utility nor short-circuits the need for social science analysis. As scholars from the UK and the US, our engagement is particular and situated, relying on an evidentiary field that arises from these two places during the time when COVID-19 predictions were being rolled out with extreme rapidity. We also share a common ethnographic orientation. In various ways and in distinct contexts, our previous work has grappled with the performativity of metrics, particularly the forms of global health attention and neglect they precipitate. COVID-19 produced in us, as medical anthropologists, a real-time collective sense of critical disorientation. We found ourselves affected by, and caring for, metrics in ways that far exceeded our basic recognition of the gap between lived experience and quantitative representation. By exploring metrics in action, we found ourselves convinced of the need to describe how the various metrics of this virus have travelled as objects with revelatory powers enabling the formation of public health solidarities. What we aim for here is a modest yet resolutely critical stance—one that takes metrics seriously as socially vital technologies, necessary monsters we should not ignore (Sismondo, 1999).

Metrical Cohesion of the Pandemic Before it Was

To tell the story of COVID-19's metrical existence, one could start with mid-20th century efforts to map viral and bacterial outbreaks (Lakoff and Collier, 2008). In the US, this history begins in 1951, when the newly formed Centers for Disease Control (CDC) deployed a team of epidemiologists to find the cause behind case reports of headaches, nausea and fatal hemorrhage among American troops in Korea (Duhigg, 2020). Their success—tracing the outbreak to rat feces, and not a bioterrorist plot (as initially suspected)—led to the institutionalization of epidemiology as a special division at the CDC, the Epidemic Intelligence Service (EIS), replicating for public health what had been created for geopolitical security in the US federal government's Central Intelligence Agency.

The fortunes of the EIS waxed and waned over the second half of the 20th cCentury, but its power was bolstered in the 1990s, as the HIV/AIDS pandemic prompted a shift in funds from primary health care back toward infectious disease control—a move, which that, as Treichler (1999) suggests, built upon and entrenched dominant discourses of risk and blame. In 1996, The CDC created a surveillance system called BioSense to detect emerging epidemics, largely focused on the US and Europe (Fearnley, 2008). BioSense inaugurated a new paradigm in public health, one directed towards deciphering syndromic patterns (respiratory and gastrointestinal arrays of symptoms) and detecting alterations, augmentations, and explosions of those patterns, rather than simply counting infection rates and deaths. Its purpose was to create a predictive apparatus that could see outbreaks coming. Narratives of 'the coming pandemic' were also strengthened by popular accounts that traced the progression from HIV and multi-drug-resistant

5

tuberculosis to socio-political and environmental changes occurring on a global scale (e.g.

Garrett, 1994).

In first two decades of the new millennium—the global health era—the emergence of

Ebola, SARS and MERS along with increasingly potent strains of influenza (Swine Flu, H1N1)

granted greater authoritative weight to models that could predict the path of outbreaks. Treatment

and mitigation efforts increasingly gave way to strategies of prophylaxis, drawing resources

away from public health infrastructure and pouring it into surveillance technologies, vaccines,

and forecasting (Lakoff, 2008, 2015; Porter, 2016). At large European and UK institutions, the

focus was on stockpiling antiviral drugs, heightening regulation of laboratories, building

surveillance technologies, and planning and conducting preparedness exercises (Bingham and

Hinchliffe, 2008; Kirchhelle, 2022; Rosner and Markowitz, 2006). In other places, massive

populations of livestock and poultry were summarily culled to prevent possibility of viral spread

(Hickler 2010). The move away from identifiable pathogenic risks to anticipated pathogenic

potentials further entailed collapsing temporal fields of operation: bringing the future to the

present (Adams, Murphy and Clarke, 2009), while also augmenting the militarization of public

health (Masco, 2014).

The shift to prediction fostered new communities of inquiry in global health. Infectious

disease MDs, pathologists, virologists and zoonosis experts teamed up with emergency

responsiveness experts, financial analysts and epidemiologists to map the viral future using ever

more sophisticated metrics. These new metrics focused less on case data (evidence of what was

already known) and more on the designation of sentinel figures (devices, animals, early human

cases) that signaled risky futures prior to actual outbreaks, as well as on the rationales for

investment (financial risk, win-win scenarios and cost effectiveness strategies) (Lakoff, 2015;

6

Lachenal, 2015; Erikson and Johnson, 2020). In 2005, the WHO called upon its Emergency

Committee to create a centralized governance infrastructure for coordinating epidemic response

with "sole power to declare the beginnings and endings of Public Health Emergencies of

International Concern (PHEIC)" (Greene and Vargha 2020). In the US, virologist Dennis Carroll

formed a pandemic-threats unit at the U.S. Agency for International Development called

PREDICT "to support discovery of potentially dangerous new viruses before they spill over into

humans" (Quammen, 2020). As experts liked to say in high profile venues from Davos to TED

talks (in words echoed by politicians), it was not a matter of *if*, but rather *when*, the next

pandemic outbreak would appear (e.g., Lakoff, 2008:34; Osterholm et al., 2015, Cooper, 2006).

This certainty was grounded in metrical knowledge.

One metric used by the Institute for Health Metrics Evaluation (IHME), was built from

templates designed at Imperial College London for modeling infectious disease outbreak and

spread as well as predictive mortality. These so-called "SIR-type" instruments took into account

Suspected, Infected and Recovered (SIR) population metrics along with country-specific data,

including social distancing policies, hospitalization rates, and death rates, to forecast the

dynamics of outbreaks in their nascent (pre-pandemic) stages complete with early indicators of

numbers of infections and deaths (Walker et.al. 2020; Fuller 2020). The IHME used the SIR

design to craft its own modeling system, extrapolating curves from previous SIR models to

create a "curve fitting model" for a range of hypothetical viruses, and to predict their progress in

a population over time (Fuller, 2020).

So how, specifically, did these metrical practices bring the COVID-19 pandemic to life?

On December 2019, in a now familiar story, the spark of recognition of a potential pandemic

materialized when a merchant who worked in a local wet-market presented with SARS-like

symptoms to a clinic in Wuhan, China. Over the next weeks, laboratory experts would decipher from this man's sputum, and a cluster of other sputum samples from other Chinese patients, evidence of a novel coronavirus, 2019-nCoV, now known as SARS-CoV-2, which causes the disease now colloquially known as COVID-19.

China's viral experts, who had been trained by US pandemic experts, were in communication with the US CDC about the outbreak. Information about the novel virus moved quickly into the airways of pandemic preparedness (Wu and McGoogan, 2020). Public and academic accounts of the events establish the following timeline: one week after China's experts sequenced the novel virus, a Seattle-baed, EIS trained infectious disease expert named Francis Reido was alerted to a 35-year-old male patient who arrived at an urgent care clinic with a four day-old cough and fever (Duhigg, 2020; Holshue, et al., 2020). His case might have been unremarkable (indeed he was sent home after leaving some swab samples), but for one thing: he had just returned to Seattle from visiting relatives in Wuhan. The patient reported that he had seen the US CDC's health alert about the outbreak in China and thus felt he should go to the clinic. This disclosure prompted his physician to call to Reido, who immediately alerted his team of EIS-trained colleagues around the world.

Reido guessed that the virus might already be more widely spread. To test his hunch, he randomly selected and tested two other patients in the Seattle area who had similar symptoms. One tested positive as a match for SARS-CoV-2. Reido raised alarm bells about this second case because it was someone who had no recent history of travel to China nor obvious connection to anyone with such a history. His colleagues then turned up an additional fourteen cases of SARS-CoV-2 seropositivity in the US, some with full blown symptoms of Covid-19 (Duhigg, 2020). Samples of the novel virus were sent to global institutions in Hong Kong, Berlin, Atlanta, and

Hamburg, where scientists developed various diagnostic tools that could be used to detect it (Wu, F. et al., 2020). By January 30th, 9976 cases were ascertained in 21 countries, including China and the US (Holshue et al., 2020).

It is worth noting that the mere identification of a novel coronavirus was not enough, in and of itself, to establish a pandemic. New viruses emerge all the time and spread globally at rates higher than those of SARS-CoV-2 at the time these data were collected. Yet only a few weeks later, when Italy had experienced only one death from COVID-19 and Iran only ten, Bill Gates was already publicly calling COVID-19 a "once in a century pandemic" (Gates, 2020). What motivated this description was not the high infection or disease counts, but rather the predictions that IHME's algorithms were generating. The IHME models painted a very frightening picture, affirming that SARS-CoV-2 would indeed cause a 'once in a century' pandemic that, if their metrical figuring was correct, would swiftly overwhelm hospitals and kill multitudes.

The facts about SARS-CoV-2 had their own agency, but they also needed to be catapulted from empirical platforms into public circulation. They needed footholds to propel them forward. They required 'once-in a century' metrical figuring—the kind offered by IMHE—that could weigh in and cut through the competing and tension-filled debates over how dangerous the virus really was. Projections of how the virus was likely to behave varied among competing models and the sociopolitical contingencies that made some models more likely to be taken seriously than others. The IHME model settled that mystery over contagion and turned SARS-CoV-2 into a public health emergency of international concern, boot-strapping an archipelago of cases into an anticipated global explosion of infection that demanded mass mobilization and response in the present.

9

We do not mean to suggest that the viral risk was not acutely real. COVID-19 caused (and indeed, continues to cause) tremendous suffering and death, undoubtedly more than has been actually counted (Sun and Achenbach 2020). Had nations not responded with the measures they did, mortality might likely have been immeasurably greater. What we are saying is that the COVID-19 pandemic that came into existence as a public health and political event could only have occurred because of the anticipatory metrical practices that were used to transform SARS-CoV-2 from a viral possibility into a matter of global health concern, and further that this configuration of a pathogenic problem delimits a very narrow and singular set of responses, experiences and potential solutions under the sign of the "once in a century pandemic."

Algorithms Make Affected Publics and Then Disperse Them

COVID-19's "once in a century" trajectory was brought forth through algorithms. An algorithm is a pre-defined operation to answer a specific problem—in the mathematical lexicon, it is an *effective* method. Through arithmetic rules and finite parameters, algorithms speak to the future, projecting scenarios that tether an eventuality to concrete actions and actualities, "clos[ing] down unknowns into a governable present" and setting up a direction for action (Rhodes, Lancaster and Rosengarten, 2020).

That power to adjudicate decisions, to intervene, to *effect* lives and livelihoods, is fueled by a heady combination of objectivity and obscurity (Ziewitz, 2016; Erikson, 2015; Kolkman and Kemper, 2017; Dixon and Chandler, 2019). In situations of crisis, where conventional forms of expertise and governance are stretched and where data is thin on the ground, algorithmic

analyses offer a way to manage uncertainty, through axiomatic, if not highly imaginative, metrical thinking. The COVID-19 pandemic was called a 'Black swan event,' an event that demands speculative and creative modes of response—a way of thinking forward, according to Osterholm et.al. (2015) ,"which is ultimately aimed at securing our collective future." The power of algorithms like those used by the IHME or the SIR models is not simply in their ability to harness predictable certainty from a series of unknowns, but also in their ability to shape affective responses. These affective powers reside in the way images of algorithmic predictions can be presented as graphs, charts, and tables that render a certainty out of a sea of competing facts. As Michelle Murphy suggests, such visual simplifications "purposively push aside complex reactivity" (see Murphy, 2017).

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Over and above their empirical basis, graphic presentations of algorithmic models have a visceral appeal, particularly when conveyed in easily readable form. The unique communicative power of the epidemic curve is a graphical referent for the anticipated experience of disaster. For COVID-19, the most commonly seen algorithmic projections were 'hockey-stick' projections—borrowing from the grammar of climate science (Demeritt, 2006). They indexed exponential growth, irreversible acceleration from disparate points of contagious contingency. A iconic form of 'pandemic prophecy,' these projections articulated an eschatological structure of feeling—the nightmare of wild and unfettered contagion capable of catalyzing global response (Caduff, 2015; Sampson, 2012).

The gradient of COVID's curve commanded this kind of negative aesthetic charisma (Lorimer, 2007). As Neil Ferguson, a prominent Imperial College London epidemiologist who would become a central figure in the UK COVID-19 response, put it: the images help us "…to wake up the world and say that this could be really bad if we don't do anything" (The

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Economist, 2015). The fact that predictions could be off by millions (as some were, for instance, with the 2014-2016 West African Ebola Outbreak), or not yet actual (as in the case of COVID-19), did not undercut the authority of the hockey stick image. The curve belongs to the future anterior. Its appalling upward slope communicates what we need to do to avert the disaster it fortells: flattening the upward climb into a rounded curve downward.

In the early days of the COVID-19 outbreak in the UK, the algorithmically derived curve functioned in this way—an epidemiological prophecy that by igniting panic, animated new publics seeing themselves reflected in and subjected to viral communicability (Briggs 2022). "This is a national endeavor," Matt Hancock, then the embattled UK Heath Secretary, told the UK public during one daily Covid briefing. "And whatever the headwinds, as a country we can't let up on this. We are past the peak. We're flattening the curve. We protected the NHS and the number of deaths is falling. We must keep our resolve" (West Bridgford Wire, 2020). It was not without some irony that this briefing built around metrical persuasion coincided with the day that Public Health England stopped performing contact tracing as infections overwhelmed surveillance capacities.

Figure 1: "Number Theater"

> **Commented [AN3]:** include photo/image credit in caption

To reduce the gradient from hockey stick to gently-sloping rise and fall, the public would have to be motivated—indeed impassioned—to play their role. And yet, the dissonance between the clarion call for civic spirit and the graphic form that patriotism took under COVID-19 was

jarring, not just for the political content of the message but for its imaginative leap in transforming individual compliance into collective sentiment—an expression of belonging, compassion and concern anchored in the figurative power of the curve. Tantamount to what David Speigelhalter, the UK Government's chief advisory statistician, termed "number theatre," the Prime Minister's daily coronavirus briefings did not operate within the province of fact; with unreliable diagnostics, uncertain case definitions and an overwhelmed contact tracing system that had ground to a halt, pronouncements about the precise scale or scope of transmission could only ever be graphically gestural. The infographics conveyed, if not statistical reason, a form of policy rationale: a cruel kind of optimism, in Berlant's (2011) terms, making sense of the price we must pay to secure our hopes for a normal future.

Those hopes were played upon and played out in a series of infographics, which smoothed the curve's charisma into a gentle downward slope to normalcy. Fueled by fears about the future, the curve served as an idiom for collective distress and a rationale for personal sacrifice and social (in)action. But as the pandemic progressed, the variety of experiences of living with and through COVID-19 departed from and competed with the singular narrative the curve relayed. Many people were simply overwhelmed by the ubiquity of metrics, as numbers proliferated with an intensity and many developed an infectious sense of obligation to watch and read them, to calibrate upticks and downticks to personal logics of risk, when to travel, whom to see, whether or not to wear masks.

Figure 2: Curve Logics and Lifestyles

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The metrics themselves became messy and contradictory, with curves, surges, and scales that became difficult to pay attention to, let alone to comprehend (Bickerstraff and Simmons, 2003; Lenzer and Brownlee, 2020; Jones & Helmriech 2020). They did not settle, and as experts engaged in public arguments over how to count, predict and mitigate COVID-19, public suspicion, cynicism and doubt grew. Debates between epidemiologists and infectious disease experts produced different modes of representing the viral threat, with one focusing on infectivity and spread and the other on how to count morbidities and deaths (and when not to count them as COVID deaths). Clinical epidemiologists like John Iaonnidis (2020), argued against the hockey stick models on that grounds that they were not evidence-based. According to Ioannidis, even though quarantine measures were advisable, the assumption of an unprecedented high mortality pandemic was putting the cart before the horse (Fuller, 2020). Mechanistic models were set against forecasting models, with one side focusing on predictions based on mechanisms of spread and pathology and the other on projections based on previous epidemic outbreaks (Holmdahl and Buckee 2020). Different kinds of futures were proposed from country to country, with different countries using different metrical tactics to calibrate national concerns. The IHME models used in the US were designed specifically to forecast death rates and hospitalization demand, but they did not take into account variation in mechanisms of transmission or how these mechanisms would alter rates, as the more mechanistic UK models did (Eker, 2020).

The metrics of COVID-19 were presented to publics in the form of predictive trends, counts of deaths and morbidity rates, and maps of danger zones. Such presentations, however provisional, conjured a continuity between the metrical images (the hockey sticks and flattened curves) and the public. These presentations assumed that the public could be counted on to act with obedience, to move between the contagious crowd—the immunogenic herd—and the

responsive political collective (Mazzarella, 2010, see also Napier, 2020). Here, too, the passage

point that would allow the metrics to be transformed into public responsiveness was affect;

metrics forged a common perception among publics who could move that behavioral wave. The

problem, however, was that, as Mazzarella (2010) notes, the public was not a crowd; it was a

multitude—a vital multiplicity of autonomously responsive beings, not a lifeless, mediated

collective. The publics who were watching those curves were neither uniform nor uniformly

affected by the beauty or horror of these representational practices, nor did they respond

homogenously.

As the authority of epidemiological forecasting wobbled under the diversity of those

experiences, agonistic public sentiment, both in the UK and the US, increasingly revealed itself

as a force in pandemic reckoning. As case fatalities increased the rhetoric of "flattening the

curve" lost its moral force—attenuated by the blatant disregard of it on the part of government

officials and technocrats who flouted the rules that algorithms had been used to put in place.

Rather than a probablable future, algorithms were used to reflect those failures, providing a

counterfactual account of the present, based on projections of what could have occurred in the

past. In his testimony before Parliament after the first wave, Ferguson reprised his reliance on the

prophetic powers of the algorithm, now as Cassandra: "the epidemic was doubling every three to

four days before lockdown interventions were introduced. So had we introduced lockdown

measures a week earlier, we would have then reduced the final death toll by at least a half".[1]

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[1] Evidence given at the House of Lords Science and Technology Committee, 10 am on Tuesday June 2nd, 2020 on the role of modelling in the UK Response. For full session see: https://www.parliament.uk/business/lords/media-centre/house-of-lords-media-notices/2020/may-20/covid19-the-role-of-modelling-in-uk-response-/https://www.parliamentlive.tv/Search?Keywords=Niel+Ferguson&Member=&MemberId=&House=&Business=&Start=05%2F06%2F2020&End=11%2F06%2F2020

Algorithmic metrics are propelled by this paradox: if the projection is heeded, then the event-as-forecasted does not come to be. As an artefact of government failure, the curve would summon anger. Rather than provide fuel for a future that might materialize, the curve generated mourning for a situation that might never have occurred. Public feelings drove complex and contradictory responses to algorithmic predictions, creating feedback loops inside the metrics themselves, as publics became increasingly skeptical of containment measures, influencing transmission trajectories. In her analysis of online COVID conspiracy theories, Renee DiResta (2020) pointed to the powers of social media platforms to facilitate questionable content promotion, facilitate rumors and spread misinformation. The sheer volume of social media content breeds what she has termed "inadvertent algorithmic amplification" or 'infodemics' that recursively fed upon their own logics, forging connections that eluded and confounded efforts at regulation (DiResta 2021, see also, Cinelli et al., 2020; Stalcup, 2020). An overreliance on the metrics, coupled with a failure to communicate their limations, had the effect of generating mistrust among members of the public. Increaseingly rarefied disciplinary debates over which transmission models were *more accurate* had the effect of discounting all models and thereby the very real risks of infection.

As new contours of viral effects were being mapped, displacing older models of morbidity and mortality, few questioned the fact that none of these models could be tested, even by their own standards. An accurate assessment of the reliability of models demands an understanding of the true prevalence of the virus—a fact that was (and remains) unknown because of the prevalence of asymptomatic cases and the broad limits of testing and reporting. That epistemic uncertainty, utterly fundamental to the metrical appearance of the COVID-19 pandemic, was persistently overlooked. Regardless, the pandemic was affirmed over and over

> **Commented [AN5]:** It would help to be consistent in how you're using quotation marks/inverted commas. I don't think we care whether you use US or UK conventions, but as I read it seems to switch back and forth

again by the metrics because the metrics had already become the means by which the pandemic was made 'real.' Public audiences conferred on the metrics their power to do/or make what the audiences (and planners) wanted or needed through forms of biomediatization (Briggs, 2022).

Unreported cases of COVID-19 continued to hover at the edges of epidemiological accounting, not only because some nations did not count their cases, but also because even in places where counting was happening, reporting was not mandatory, making any statistical management of the virus problematic. We will never know COVID-19's deadliness in relation to its infectivity rate, because we cannot account for the many people who actually had the virus and recovered without reporting it, even when it was symptomatic. Such obvious gaps in knowledge made the numbers untrustworthy even to lay observers, weakening the ability of the metrics to govern uniform public responses.

Metrics, in other words, in their unruliness and uncertainty, brought about a pandemic that could not be affectively contained. The surplus feeling generated by metrical practices displaced the ability of public health efforts to accomplish their primary goals of generating safe responses. These might be called 'viral' potencies of the metrics in the sense that their real effects spread of their own accord, whether in motivating commitment to vaccines and masking or, conversely, supporting refusal of these practices on grounds that were untrustworthy. These unanticipated effects were a consequence of the excesses of metrical representations as much as they were an effect of the metrics' rationality.

Metrical Erasures

Descriptive metrics used to count case loads and death rates of COVID-19, along with the predictive metrics that warned of mass mortalities, distilled the story of the pandemic into one about a deadly virus on the move. This viral narrative, however, effaced other stories that offered a more complex accounting of COVID-19's pathology. SARS-CoV-2 was not an indiscriminate agent. As many anthropologists have noted (Manderson, Burke, and Wahlberg, 2021; Oliveira and Aguiar Arantes, 2020), some communities were more at risk of both contracting and dying from it than others. Moreover, the metrics that focused on viral movements had a hard time tracking those aspects of SARS-CoV-2 that did not behave like a typical virus, including those whose experience of COVID-19 persisted. What stories might have been told had the metrics focused on, or included, these confounding factors?

Consider the non-story of New York City— which for many weeks in the northern spring of 2020 was the epicenter of the global pandemic. In that city, as elsewhere across the country, a chronically high and maldistributed burden of comorbidities shaped viral outcomes. Yet, as SARS-CoV-2 became the overwhelming object of epidemiological focus, any accounting for the complexity of multimorbidity and its underlying web of causation was foreclosed. The viral agent took over as the lead actor because in the pandemic narrative, all excess mortality was tied to the spread of the novel viral pathogen. What was effaced in this narrative was the story about the production of co-morbidities that actually underpinned higher death rates, the toxic foods and chemical exposures, the racism baked into the US health care system at every level— all of which have contributed to a long and steady state of debilitation and slow death (Livingston, 2020). Rising slowly, creeping up over so many decades, the counting of co-morbidities and their causes became normalized as static variables rather than as causal of morbidity in and of themselves (Adams, 2020; Caduff, 2020).

The organization of data into globally and regionally comparative sets meant to signal rising and falling rates of peril and burdens of loss in a given city, province, or nation formed scalar operations that effaced the hierarchies of risk and disposibility within any given population. Risk factors that were tied to social inequalities remained largely invisible in the daily accounting of morbidity and deaths that circulated as policy-making instruments. For example, the daily accounted figure of hospital deaths through which New York was compared to Chicago or Little Rock or Milan, obscured the maldistribution of hospital mortality within the city. Some chronically under-resourced hospitals in neighborhoods that were home to disproportionate numbers of "essential workers" had much higher mortality rates than more capitalized hospitals in wealthier neighborhoods. In the publicly reported metrics also, morbidities of so-called "essential workers" who were unable to quarantine were lumped in with those whose morbidities were a consequence of other risk exposures (Livingston 2022). What if the numbers had focused on how these subpopulations were over-exposed to the virus in relation to basic social inequalities of labor and wealth? How might our ability to understand the pandemic, and to generate effective responses, have been different if our counting practices had offered more subtle distinctions based on the social contours of risk that preceed and outlive the virus?

It is true that eventually some efforts were made to locate high risk populations in residential institutions. Specifically, nursing home cases and deaths were counted alongside those in city jails and state prisons. A portion of the pandemic was now metrically and materially sealed off from the general public in these institutions. Visiting was suspended to either kind of institution, and relatives worried from a distance, imagining worst case stories spun from the metrics. Despite their radically different positions vis a vis one another, staff and elderly nursing

home residents; guards and incarcerated persons, shared in the high rates of infection and carried

the taint of social death. The sealing off of metrics into institutional sub-epidemics here glossed

crass questions and equally crass answers. Once we had the numbers, did this counting lead to

efforts to improve conditions of living at such places? No. They too were wrapped around the

narrative of viral exposure, and questions about whether a death in a nursing home *counted* the

same as death among the "general" public.

Epidemiologists did eventually try to isolate key variables or expressions for

quantification, to examine factors in isolation and then in modeled, abstract combinations. But

the modeling of the pandemic as singular *event*, albeit a highly complex and multifactoral one

built out of big, dynamic, and complex data sets, bounded the story of the pandemic from the

bigger story of disaster in which it sat. Suspended from the narrative, or relegated to its margins,

was the refugee crisis that months before SARS-CoV-2 had been the subject of much

metricization, even as the pandemic demonstrated that it was the air travel of the wealthy and not

the rubber boats of the poor and displaced that spread disease and economic turmoil. The fires,

the hurricanes, the plastic-choked oceans, and the sixth extinction were held off stage as causal

relations of the pandemic death march. The viral narrative could not hold simultaneously

damning evidence of bleach, the cleaning chemicals, the thousands upon thousands of tons of

disposable everything whose availability was suddenly all the more important for safety than

harm, metricized as proxies for political efficacy. The stock market ticker tape and the metrics of

death and devastation continued to diverge, lurching forward toward the uptick in corporate

profits on the mere premise (with no actual evidence) that technical tools like vaccines were just

around the corner.

The metrics of COVID-19 thus operated as instruments that concealed some realities while conjuring others as acts of artifice, driving forward the industrial complex of free-market competitors perched to 'rescue' populations under the rubric of emergency spending and social lockdowns, while simultaneously making it harder to see how transmission dovetailed with pre-existing health and existential risk. What was missed in all this counting, however, were the emerging realities that did not fit the disaster-event narrative form. Consider the multitudes of those whose symptoms of COVID-19 lingered, whose experience of the virus was chronic rather than acute.

For those with what became named 'long COVID,' navigating their illness required wading through metrical indicators that were most often shown as either cases or deaths, initially leaving such patients unaccounted. The quest for 'true' numbers required deciphering uncertainties produced through testing technologies, sampling strategies and attribution of fatalities to the virus. Though abstract, population level statistical data were instructive to individuals with symptoms hoping to understand and anticipate the effects of the virus as an embodied experience. What did it mean to become a 'case,' and how might one anticipate becoming a 'death'? The conferring of a disease label, traditionally understood to enable access to both information—about the trajectory and ways to manage a disease— and treatment, were confounded by the sea of metrics that circulated already. The first challenge for many with symptoms was in accessing such a disease label, not only because the testing rules were uncertain but also because testing was unreliable, especially for those whose illness exceeded the 14-day expected symptom window. Symptomatic people were consistently turned away by health care services, left without the information or treatment they hoped to receive (see Callard, 2020; Greenhalgh et al., 2020).

The self-diagnosed soon became a sizable proportion of COVID-19 'cases,' joining those with official diagnoses in turning to social media to decipher their experience and produce collective knowledge, including metricized data, in a manner familiar from patient experiences of other "contested illnesses" (Dumes, 2019; Rogers, 2022; Murphy, 2006). Online forums for people experiencing COVID-19 appeared on Facebook, Slack and other online community platforms early on in the pandemic and quickly accumulated thousands of members from all around the world. Reports of alarming pulmonary, heart and neurological symptoms, among other things, began to float across the internet as people with symptoms tried to make sense of their altered bodies and lives. The COVID-19 Body Politic Slack Group (2020), for instance, polled 640 respondents at the end of April 2020 at a point when symptoms for most respondents were ongoing, averaging 40 days according to its survey. Sharing experiences to cross-check their own status, to seek reassurance and gain support for deciphering medical systems, members collectively formulated a metrical image of the disease that differed from those offered by medical experts. Members crowd-sourced data to create their own epidemiological analyses of the nature and trajectories of symptoms. Both of these dimensions—visceral and temporal—were notably encountered, narrated and calibrated through crowdsourced metrics.

Here too, we call attention to the way that the viral narrative that circulating alongside metrics of COVID morbidity and mortality—one that presented it as a once in a century event that would be conquered by vaccines and good behavior—made it hard to hear those whose experience of the disease did not fit the mold of the time-limited event. Like the chronic morbidities that were treated as 'static' in the figuration of the virus's ebb and flow but not really counted, those whose experience of COVID-19 did not subside after the prescribed prognosis found themselves neglected. In order to be seen, they had to bootstrap their own metrics and

2

force their experiences into public visibility. The metrics, too, co-constituted the pandemic and the experience of it.

Coda

On May 5, 2023, the World Health Organization declared an end to the Global Public Health Emergency, three years after the SARS--C0V--2 virus appeared on the radar of epidemiologists, and even though the death toll of nearly 7 million people continued its (now slower) ~~slow~~rise. Looking back, it would be hard to deny that the COVID-19 pandemic was a once-in-a-century event. To what degree that exceptionality was a feature of the virus's trajectory across populations and place and to what extent it was an artifact of the metrical storm through which the pandemic made landfall is now impossible to decipher. The coronavirus remains a total social fact—a tangled nexus of metrical and viral information, of political calculation and public affect, organizing and orchestrating new global realities.

Here we have reflected on some of the metrics of COVID-19 in relation to their affective potencies and their narrative opportunities, misdirections and erasures. In doing so, we have tried to focus how metrics co-constituted the pandemic in conversation with the virus as well as the capacity of metrics to engage the public in ways that cannot be contained, and their forging of narrative arcs that tell some stories while excluding others. Our hope is that by interrogating the pandemic in this way, we have also added more to the anthropological analysis of how metrics work in our pandemic times. Pandemic metrics persist, haunting the present, waiting to offer prognostications of return or of an altogether new outbreak. At a minimum, we suggest that a

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critical interrogation of the metrics at work in the COVID-19 pandemic makes it clear that the

experience of COVID-19 was as much an experience of the metrics as it was of the virus.

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A Pandemic of Metrics

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Abstract: The COVID-19 pandemic prompted critical attention to the performative power of metrics. We suggest that the existential capacities of metrics as a means of pandemic living warrants further consideration. We describe how the COVD-19 pandemic that came into existence as a public health and political event could only have occurred because of the anticipatory metrical practices that were used to transform SARS-COV-2 into a matter of global health concern. By exploring the affective potencies of COVID-19 metrics we show their abilities to engage the public in ways that cannot be contained; in detailing the narrative arcs created through metrics we show their opportunities, misdirections and erasures. A pandemic way of life persists: a pandemic of metrics.

In short, models and simulations cut across boundaries of pure categories we accept in science, and sometimes politics. Some people might be tempted to see the compromises that models make — between the domains of the theoretical and the material, between their uses as pragmatic and representational objects, between different goals — as unsatisfactory, to see it as simple inconsistency or imperfection. But we might choose instead to see models and simulations as monsters necessary to mediate between worlds that cannot stand on their own, or that are unmanageable.

– Sergio Sismondo 1999

The experience of COVID-19 got many ethnographers thinking and writing in new ways about the metrics and the metrical infrastructures that animate public health interventions (e.g., Anderson, 2021; Block et al., 2020; Bermant, Soto and Ssorin-Chaikov, 2020; Breslin et al. 2022; Christin, 2020; Jones and Helmriech, 2020). This was, in no small part, because the work of rendering the COVID-19 pandemic visible far exceeded the rationalities of quantitative calculation. The proliferation of metrics within a situation of radical contingency turned many into amateur epidemiologists, looking to 'the numbers' to provide a compass to social and professional engagements, and to calculate the chances for their survival and those of loved ones. Numbers presented in graphs, tables and maps as metrical figurations also created footholds for finding fault with political systems and for imagining collective economic futures. It is precisely because the metrics in these moments were so salient—because so many reached for them

2

desperately—that their promise and power continues to demand scrutiny. Here, we offer a critical reflection on the way metrics co-created the COVID pandemic and its afterlives, asking: How did metrics, as artifacts with peculiar and particular capacities, transform a virus into what might be called *a pandemic of metrics?*

Long before SARS-CoV-2, metrical figurations were quietly creating the conditions for the distillation of uncertain biological phenomena into *pandemics*. The scale and pace of infectious disease outbreaks are a feature of our contemporary predicament. Environmental degradation, rapid urbanization, mass migration, and climate change have created the conditions for viruses and bacteria to mutate, jump species and amplify within human populations (Brown and Kelly, 2014). Predictive epidemiological and infectious disease sciences have rendered those crescendos of pathogenic interactivity as 'wave-like' (Jones and Helmriech, 2020), offering prophetic messages about the inevitability of 'the next one' (Caduff, 2015). Metrics have also set in motion a looming recursivity in which viruses like SARS-CoV-2 are sutured to market-driven preparedness agendas and reinvigorated protectionist policies, creating crises we can never really shake off (Erikson, 2015; Wraith and Stephenson, 2009). "Like infectious agents on an agar plate," Greene and Vargha write, pandemics "colonize our social lives and force us to learn to live with them, in some way or another, for the foreseeable future" (2020, 22). We would add that this power is animated by metrics and their capacity to create a new calculus of vulnerabilities, as clusters of socioeconomic precarity emerge and endure (Benton, 2015; Ticktin, 2020).

The term 'metrics' is used in population health to denote a wide variety of quantitative measuring and emplotment processes. Metrics are never simply available in the 'real' world; they have to be composed using available means of quantitatively 'reading' the world. They can

be many different things, from standard measures and benchmarks to big data sets, models and actuarial estimates, all performing different operations in different epistemic spaces. Metrics carry performative power, derived in part from their ability to help experts manage the unknown in ways that are (at least statistically) reliable. Metrical practices do this by stabilizing the complexity of lived social worlds, turning transient and situationally contingent phenomena into obdurate, reductive and comparable data through modes of counting, modeling practices, algorithmic emplotment, and statistical evaluations. Variously represented in graphs, charts, equations and diagrams, metrics are potent because they are scalar (able to move from small samples to populations, for instance) and because they can be tested for validity.

It is precisely these powers that compel anthropological critique. In this effort, we join scholars who have revealed the stakes of metrical reasoning and praxis, showing how metrics can distort perceptions of the world both by excluding information and by constituting new realities through commodifying, objectifying and essentializing social realities (e.g., Adams, 2016; Greene, 2009; Erikson, 2019; Reubi, 2018; Sangaramoorthy and Benton, 2012; Treichler, 1999). We also build upon recent social scientific critiques concerned with the social contingencies of mathematical models and how these quantitive operations themselves can generate novel forms of sociality (e.g. Brown, 2020; Rhodes and Lancaster, 2020, Richardson, 2020). Our goal here is to extend those insights to the metrical assemblage of pandemic life. To that end, we examine how the pandemic of metrics in relation to COVID-19 in the US and the UK worked in at least three ways: 1) as technological enactments that conjured a once in a century pandemic; 2) as affective events that produced a manageable, and then an unmanageable, public; and 3) as instruments that mediated social worlds, even as they closed down opportunities for political accountability.

Undertaking this analysis is not without risks. As conspiracy theories continue to roil government responses to large scale public health crises across the globe, an analysis of the compromises and fetishisms attendant to such quantification could seem inappropriate and inopportune. Still, knowing that metrics are unstable, black-boxed, provisional, and capable of doing harm neither forecloses the debate about their utility nor short-circuits the need for social science analysis. As scholars from the UK and the US, our engagement is particular and situated, relying on an evidentiary field that arises from these two places during the time when COVID-19 predictions were being rolled out with extreme rapidity. We also share a common ethnographic orientation. In various ways and in distinct contexts, our previous work has grappled with the performativity of metrics, particularly the forms of global health attention and neglect they precipitate. COVID-19 produced in us, as medical anthropologists, a real-time collective sense of critical disorientation. We found ourselves affected by, and caring for, metrics in ways that far exceeded our basic recognition of the gap between lived experience and quantitative representation. By exploring metrics in action, we found ourselves convinced of the need to describe how the various metrics of this virus have travelled as objects with revelatory powers enabling the formation of public health solidarities. What we aim for here is a modest yet resolutely critical stance—one that takes metrics seriously as socially vital technologies, necessary monsters we should not ignore (Sismondo, 1999).

Metrical Cohesion of the Pandemic Before it Was

5

To tell the story of COVID-19's metrical existence, one could start with mid-20th century efforts to map viral and bacterial outbreaks (Lakoff and Collier, 2008). In the US, this history begins in 1951, when the newly formed Centers for Disease Control (CDC) deployed a team of epidemiologists to find the cause behind case reports of headaches, nausea and fatal hemorrhage among American troops in Korea (Duhigg, 2020). Their success—tracing the outbreak to rat feces, and not a bioterrorist plot (as initially suspected)—led to the institutionalization of epidemiology as a special division at the CDC, the Epidemic Intelligence Service (EIS), replicating for public health what had been created for geopolitical security in the US federal government's Central Intelligence Agency.

The fortunes of the EIS waxed and waned over the second half of the 20th century, but its power was bolstered in the 1990s, as the HIV/AIDS pandemic prompted a shift in funds from primary health care back toward infectious disease control—a move that, as Treichler (1999) suggests, built upon and entrenched dominant discourses of risk and blame. In 1996, The CDC created a surveillance system called BioSense to detect emerging epidemics, largely focused on the US and Europe (Fearnley, 2008). BioSense inaugurated a new paradigm in public health, one directed towards deciphering syndromic patterns (respiratory and gastrointestinal arrays of symptoms) and detecting alterations, augmentations, and explosions of those patterns, rather than simply counting infection rates and deaths. Its purpose was to create a predictive apparatus that could see outbreaks coming. Narratives of 'the coming pandemic' were also strengthened by popular accounts that traced the progression from HIV and multi-drug-resistant tuberculosis to socio-political and environmental changes occurring on a global scale (e.g. Garrett, 1994).

In first two decades of the new millennium—the global health era—the emergence of Ebola, SARS and MERS along with increasingly potent strains of influenza (Swine Flu, H1N1)

granted greater authoritative weight to models that could predict the path of outbreaks. Treatment

and mitigation efforts increasingly gave way to strategies of prophylaxis, drawing resources

away from public health infrastructure and pouring it into surveillance technologies, vaccines,

and forecasting (Lakoff, 2008, 2015; Porter, 2016). At large European and UK institutions, the

focus was on stockpiling antiviral drugs, heightening regulation of laboratories, building

surveillance technologies, and planning and conducting preparedness exercises (Bingham and

Hinchliffe, 2008; Kirchhelle, 2022; Rosner and Markowitz, 2006). In other places, massive

populations of livestock and poultry were summarily culled to prevent possibility of viral spread

(Hickler 2010). The move away from identifiable pathogenic risks to anticipated pathogenic

potentials further entailed collapsing temporal fields of operation: bringing the future to the

present (Adams, Murphy and Clarke, 2009), while also augmenting the militarization of public

health (Masco, 2014).

The shift to prediction fostered new communities of inquiry in global health. Infectious

disease MDs, pathologists, virologists and zoonosis experts teamed up with emergency

responsiveness experts, financial analysts and epidemiologists to map the viral future using ever

more sophisticated metrics. These new metrics focused less on case data (evidence of what was

already known) and more on the designation of sentinel figures (devices, animals, early human

cases) that signaled risky futures prior to actual outbreaks, as well as on the rationales for

investment (financial risk, win-win scenarios and cost effectiveness strategies) (Lakoff, 2015;

Lachenal, 2015; Erikson and Johnson, 2020). In 2005, the WHO called upon its Emergency

Committee to create a centralized governance infrastructure for coordinating epidemic response

with "sole power to declare the beginnings and endings of Public Health Emergencies of

International Concern (PHEIC)" (Greene and Vargha 2020). In the US, virologist Dennis Carroll

formed a pandemic-threats unit at the U.S. Agency for International Development called PREDICT "to support discovery of potentially dangerous new viruses before they spill over into humans" (Quammen, 2020). As experts liked to say in high profile venues from Davos to TED talks (in words echoed by politicians), it was not a matter of *if,* but rather *when*, the next pandemic outbreak would appear (e.g., Lakoff, 2008:34; Osterholm et al., 2015, Cooper, 2006). This certainty was grounded in metrical knowledge.

One metric used by the Institute for Health Metrics Evaluation (IHME), was built from templates designed at Imperial College London for modeling infectious disease outbreak and spread as well as predictive mortality. These so-called "SIR-type" instruments took into account Suspected, Infected and Recovered (SIR) population metrics along with country-specific data, including social distancing policies, hospitalization rates, and death rates, to forecast the dynamics of outbreaks in their nascent (pre-pandemic) stages complete with early indicators of numbers of infections and deaths (Walker et.al. 2020; Fuller 2020). The IHME used the SIR design to craft its own modeling system, extrapolating curves from previous SIR models to create a "curve fitting model" for a range of hypothetical viruses, and to predict their progress in a population over time (Fuller, 2020).

So how, specifically, did these metrical practices bring the COVID-19 pandemic to life? On December 2019, in a now familiar story, the spark of recognition of a potential pandemic materialized when a merchant who worked in a local wet-market presented with SARS-like symptoms to a clinic in Wuhan, China. Over the next weeks, laboratory experts would decipher from this man's sputum, and a cluster of other sputum samples from other Chinese patients, evidence of a novel coronavirus, 2019-nCoV, now known as SARS-CoV-2, which causes the disease now colloquially known as COVID-19.

China's viral experts, who had been trained by US pandemic experts, were in communication with the US CDC about the outbreak. Information about the novel virus moved quickly into the airways of pandemic preparedness (Wu and McGoogan, 2020). Public and academic accounts of the events establish the following timeline: one week after China's experts sequenced the novel virus, a Seattle-baed, EIS trained infectious disease expert named Francis Reido was alerted to a 35-year-old male patient who arrived at an urgent care clinic with a four day-old cough and fever (Duhigg, 2020; Holshue, et al., 2020). His case might have been unremarkable (indeed he was sent home after leaving some swab samples), but for one thing: he had just returned to Seattle from visiting relatives in Wuhan. The patient reported that he had seen the US CDC's health alert about the outbreak in China and thus felt he should go to the clinic. This disclosure prompted his physician to call to Reido, who immediately alerted his team of EIS-trained colleagues around the world.

Reido guessed that the virus might already be more widely spread. To test his hunch, he randomly selected and tested two other patients in the Seattle area who had similar symptoms. One tested positive as a match for SARS-CoV-2. Reido raised alarm bells about this second case because it was someone who had no recent history of travel to China nor obvious connection to anyone with such a history. His colleagues then turned up an additional fourteen cases of SARS-CoV-2 seropositivity in the US, some with full blown symptoms of Covid-19 (Duhigg, 2020). Samples of the novel virus were sent to global institutions in Hong Kong, Berlin, Atlanta, and Hamburg, where scientists developed various diagnostic tools that could be used to detect it (Wu, F. et al., 2020). By January 30th, 9976 cases were ascertained in 21 countries, including China and the US (Holshue et al., 2020).

It is worth noting that the mere identification of a novel coronavirus was not enough, in and of itself, to establish a pandemic. New viruses emerge all the time and spread globally at rates higher than those of SARS-CoV-2 at the time these data were collected. Yet only a few weeks later, when Italy had experienced only one death from COVID-19 and Iran only ten, Bill Gates was already publicly calling COVID-19 a "once in a century pandemic" (Gates, 2020). What motivated this description was not the high infection or disease counts, but rather the predictions that IHME's algorithms were generating. The IHME models painted a very frightening picture, affirming that SARS-CoV-2 would indeed cause a 'once in a century' pandemic that, if their metrical figuring was correct, would swiftly overwhelm hospitals and kill multitudes.

The facts about SARS-CoV-2 had their own agency, but they also needed to be catapulted from empirical platforms into public circulation. They needed footholds to propel them forward. They required 'once-in a century' metrical figuring—the kind offered by IMHE—that could weigh in and cut through the competing and tension-filled debates over how dangerous the virus really was. Projections of how the virus was likely to behave varied among competing models and the sociopolitical contingencies that made some models more likely to be taken seriously than others. The IHME model settled that mystery over contagion and turned SARS-CoV-2 into a public health emergency of international concern, boot-strapping an archipelago of cases into an anticipated global explosion of infection that demanded mass mobilization and response in the present.

We do not mean to suggest that the viral risk was not acutely real. COVID-19 caused (and indeed, continues to cause) tremendous suffering and death, undoubtedly more than has been actually counted (Sun and Achenbach 2020). Had nations not responded with the measures

they did, mortality might likely have been immeasurably greater. What we are saying is that the COVID-19 pandemic that came into existence as a public health and political event could only have occurred because of the anticipatory metrical practices that were used to transform SARS-CoV-2 from a viral possibility into a matter of global health concern, and further that this configuration of a pathogenic problem delimits a very narrow and singular set of responses, experiences and potential solutions under the sign of the "once in a century pandemic."

Algorithms Make Affected Publics and Then Disperse Them

COVID-19's "once in a century" trajectory was brought forth through algorithms. An algorithm is a pre-defined operation to answer a specific problem—in the mathematical lexicon, it is an *effective* method. Through arithmetic rules and finite parameters, algorithms speak to the future, projecting scenarios that tether an eventuality to concrete actions and actualities, "clos[ing] down unknowns into a governable present" and setting up a direction for action (Rhodes, Lancaster and Rosengarten, 2020).

That power to adjudicate decisions, to intervene, to *effect* lives and livelihoods, is fueled by a heady combination of objectivity and obscurity (Ziewitz, 2016; Erikson, 2015; Kolkman and Kemper, 2017; Dixon and Chandler, 2019). In situations of crisis, where conventional forms of expertise and governance are stretched and where data is thin on the ground, algorithmic analyses offer a way to manage uncertainty, through axiomatic, if not highly imaginative, metrical thinking. The COVID-19 pandemic was called a 'Black swan event,' an event that demands speculative and creative modes of response—a way of thinking forward, according to

Osterholm et.al. (2015) ,"which is ultimately aimed at securing our collective future." The power

of algorithms like those used by the IHME or the SIR models is not simply in their ability to

harness predictable certainty from a series of unknowns, but also in their ability to shape

affective responses. These affective powers reside in the way images of algorithmic predictions

can be presented as graphs, charts, and tables that render a certainty out of a sea of competing

facts. As Michelle Murphy suggests, such visual simplifications "purposively push aside

complex reactivity" (Murphy, 2017: 495).

Over and above their empirical basis, graphic presentations of algorithmic models have a

visceral appeal, particularly when conveyed in easily readable form. The unique communicative

power of the epidemic curve is a graphical referent for the anticipated experience of disaster. For

COVID-19, the most commonly seen algorithmic projections were 'hockey-stick' projections—

borrowing from the grammar of climate science (Demeritt, 2006). They indexed exponential

growth, irreversible acceleration from disparate points of contagious contingency. A iconic form

of 'pandemic prophecy,' these projections articulated an eschatological structure of feeling—the

nightmare of wild and unfettered contagion capable of catalyzing global response (Caduff, 2015;

Sampson, 2012).

The gradient of COVID's curve commanded this kind of negative aesthetic charisma

(Lorimer, 2007). As Neil Ferguson, a prominent Imperial College London epidemiologist who

would become a central figure in the UK COVID-19 response, put it: the images help us "…to

wake up the world and say that this could be really bad if we don't do anything" (The

Economist, 2015). The fact that predictions could be off by millions (as some were, for instance,

with the 2014-2016 West African Ebola Outbreak), or not yet actual (as in the case of COVID-

19), did not undercut the authority of the hockey stick image. The curve belongs to the future

1

anterior. Its appalling upward slope communicates what we need to do to avert the disaster it fortells: flattening the upward climb into a rounded curve downward.

In the early days of the COVID-19 outbreak in the UK, the algorithmically derived curve functioned in this way—an epidemiological prophecy that by igniting panic, animated new publics seeing themselves reflected in and subjected to viral communicability (Briggs 2022). "This is a national endeavor," Matt Hancock, then the embattled UK Heath Secretary, told the UK public during one daily Covid briefing. "And whatever the headwinds, as a country we can't let up on this. We are past the peak. We're flattening the curve. We protected the NHS and the number of deaths is falling. We must keep our resolve" (West Bridgford Wire, 2020). It was not without some irony that this briefing built around metrical persuasion coincided with the day that Public Health England stopped performing contact tracing as infections overwhelmed surveillance capacities.

Figure 1: Number Theater. Source Publication: HM Government, Press Briefing, 10 Downing Street, March 12, 2020. https://www.gov.uk/government/speeches/pm-statement-on-coronavirus-12-march-2020

To reduce the gradient from hockey stick to gently-sloping rise and fall, the public would have to be motivated—indeed impassioned—to play their role. And yet, the dissonance between the clarion call for civic spirit and the graphic form that patriotism took under COVID-19 was jarring, not just for the political content of the message but for its imaginative leap in transforming individual compliance into collective sentiment—an expression of belonging,

compassion and concern anchored in the figurative power of the curve. Tantamount to what David Speigelhalter, the UK Government's chief advisory statistician, termed "number theatre," the Prime Minister's daily coronavirus briefings did not operate within the province of fact; with unreliable diagnostics, uncertain case definitions and an overwhelmed contact tracing system that had ground to a halt, pronouncements about the precise scale or scope of transmission could only ever be graphically gestural. The infographics conveyed, if not statistical reason, a form of policy rationale: a cruel kind of optimism, in Berlant's (2011) terms, making sense of the price we must pay to secure our hopes for a normal future.

Those hopes were played upon and played out in a series of infographics, which smoothed the curve's charisma into a gentle downward slope to normalcy. Fueled by fears about the future, the curve served as an idiom for collective distress and a rationale for personal sacrifice and social (in)action. But as the pandemic progressed, the variety of experiences of living with and through COVID-19 departed from and competed with the singular narrative the curve relayed. Many people were simply overwhelmed by the ubiquity of metrics, as numbers proliferated with an intensity and many developed an infectious sense of obligation to watch and read them, to calibrate upticks and downticks to personal logics of risk, when to travel, whom to see, whether or not to wear masks.

Figure 2: Curve Lifestyles and Logics. Source Publication: HM Government, Press Briefing, 10 Downing Street, May 11, 2020. https://www.gov.uk/government/speeches/pm-statement-on-coronavirus-11-may-2020

The metrics themselves became messy and contradictory, with curves, surges, and scales that became difficult to pay attention to, let alone to comprehend (Bickerstraff and Simmons, 2003; Lenzer and Brownlee, 2020; Jones & Helmriech 2020). They did not settle, and as experts engaged in public arguments over how to count, predict and mitigate COVID-19, public suspicion, cynicism and doubt grew. Debates between epidemiologists and infectious disease experts produced different modes of representing the viral threat, with one focusing on infectivity and spread and the other on how to count morbidities and deaths (and when not to count them as COVID deaths). Clinical epidemiologists like John Iaonnidis (2020), argued against the hockey stick models on that grounds that they were not evidence-based. According to Ioannidis, even though quarantine measures were advisable, the assumption of an unprecedented high mortality pandemic was putting the cart before the horse (Fuller, 2020). Mechanistic models were set against forecasting models, with one side focusing on predictions based on mechanisms of spread and pathology and the other on projections based on previous epidemic outbreaks (Holmdahl and Buckee 2020). Different kinds of futures were proposed from country to country, with different countries using different metrical tactics to calibrate national concerns. The IHME models used in the US were designed specifically to forecast death rates and hospitalization demand, but they did not take into account variation in mechanisms of transmission or how these mechanisms would alter rates, as the more mechanistic UK models did (Eker, 2020).

The metrics of COVID-19 were presented to publics in the form of predictive trends, counts of deaths and morbidity rates, and maps of danger zones. Such presentations, however provisional, conjured a continuity between the metrical images (the hockey sticks and flattened curves) and the public. These presentations assumed that the public could be counted on to act with obedience, to move between the contagious crowd—the immunogenic herd—and the

responsive political collective (Mazzarella, 2010, see also Napier, 2020). Here, too, the passage point that would allow the metrics to be transformed into public responsiveness was affect; metrics forged a common perception among publics who could move that behavioral wave. The problem, however, was that, as Mazzarella (2010) notes, the public was not a crowd; it was a multitude—a vital multiplicity of autonomously responsive beings, not a lifeless, mediated collective. The publics who were watching those curves were neither uniform nor uniformly affected by the beauty or horror of these representational practices, nor did they respond homogenously.

As the authority of epidemiological forecasting wobbled under the diversity of those experiences, agonistic public sentiment, both in the UK and the US, increasingly revealed itself as a force in pandemic reckoning. As case fatalities increased the rhetoric of "flattening the curve" lost its moral force—attenuated by the blatant disregard of it on the part of government officials and technocrats who flouted the rules that algorithms had been used to put in place. Rather than a probablable future, algorithms were used to reflect those failures, providing a counterfactual account of the present, based on projections of what could have occurred in the past. In his testimony before Parliament after the first wave, Ferguson reprised his reliance on the prophetic powers of the algorithm, now as Cassandra: "the epidemic was doubling every three to four days before lockdown interventions were introduced. So had we introduced lockdown measures a week earlier, we would have then reduced the final death toll by at least a half".[1]

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[1] Evidence given at the House of Lords Science and Technology Committee, 10 am on Tuesday June 2nd, 2020 on the role of modelling in the UK Response. For full session see: https://www.parliament.uk/business/lords/media-centre/house-of-lords-media-notices/2020/may-20/covid19-the-role-of-modelling-in-uk-response-/https://www.parliamentlive.tv/Search?Keywords=Niel+Ferguson&Member=&MemberId=&House=&Business=&Start=05%2F06%2F2020&End=11%2F06%2F2020

Algorithmic metrics are propelled by this paradox: if the projection is heeded, then the event-as-forecasted does not come to be. As an artefact of government failure, the curve would summon anger. Rather than provide fuel for a future that might materialize, the curve generated mourning for a situation that might never have occurred. Public feelings drove complex and contradictory responses to algorithmic predictions, creating feedback loops inside the metrics themselves, as publics became increasingly skeptical of containment measures, influencing transmission trajectories. In her analysis of online COVID conspiracy theories, Renee DiResta (2020) pointed to the powers of social media platforms to facilitate questionable content promotion, facilitate rumors and spread misinformation. The sheer volume of social media content breeds what she has termed "inadvertent algorithmic amplification" or "infodemics" that recursively fed upon their own logics, forging connections that eluded and confounded efforts at regulation (DiResta 2021, see also, Cinelli et al., 2020; Stalcup, 2020). An overreliance on the metrics, coupled with a failure to communicate their limations, had the effect of generating mistrust among members of the public. Increasingly rarefied disciplinary debates over which transmission models were *more accurate* had the effect of discounting all models and thereby the very real risks of infection.

As new contours of viral effects were being mapped, displacing older models of morbidity and mortality, few questioned the fact that none of these models could be tested, even by their own standards. An accurate assessment of the reliability of models demands an understanding of the true prevalence of the virus—a fact that was (and remains) unknown because of the prevalence of asymptomatic cases and the broad limits of testing and reporting. That epistemic uncertainty, utterly fundamental to the metrical appearance of the COVID-19 pandemic, was persistently overlooked. Regardless, the pandemic was affirmed over and over

again by the metrics because the metrics had already become the means by which the pandemic was made 'real.' Public audiences conferred on the metrics their power to do/or make what the audiences (and planners) wanted or needed through forms of biomediatization (Briggs, 2022).

Unreported cases of COVID-19 continued to hover at the edges of epidemiological accounting, not only because some nations did not count their cases, but also because even in places where counting was happening, reporting was not mandatory, making any statistical management of the virus problematic. We will never know COVID-19's deadliness in relation to its infectivity rate, because we cannot account for the many people who actually had the virus and recovered without reporting it, even when it was symptomatic. Such obvious gaps in knowledge made the numbers untrustworthy even to lay observers, weakening the ability of the metrics to govern uniform public responses.

Metrics, in other words, in their unruliness and uncertainty, brought about a pandemic that could not be affectively contained. The surplus feeling generated by metrical practices displaced the ability of public health efforts to accomplish their primary goals of generating safe responses. These might be called 'viral' potencies of the metrics in the sense that their real effects spread of their own accord, whether in motivating commitment to vaccines and masking or, conversely, supporting refusal of these practices on grounds that were untrustworthy. These unanticipated effects were a consequence of the excesses of metrical representations as much as they were an effect of the metrics' rationality.

Metrical Erasures

Descriptive metrics used to count case loads and death rates of COVID-19, along with the predictive metrics that warned of mass mortalities, distilled the story of the pandemic into one about a deadly virus on the move. This viral narrative, however, effaced other stories that offered a more complex accounting of COVID-19's pathology. SARS-CoV-2 was not an indiscriminate agent. As many anthropologists have noted (Manderson, Burke, and Wahlberg, 2021; Oliveira and Aguiar Arantes, 2020), some communities were more at risk of both contracting and dying from it than others. Moreover, the metrics that focused on viral movements had a hard time tracking those aspects of SARS-CoV-2 that did not behave like a typical virus, including those whose experience of COVID-19 persisted. What stories might have been told had the metrics focused on, or included, these confounding factors?

Consider the non-story of New York City— which for many weeks in the northern spring of 2020 was the epicenter of the global pandemic. In that city, as elsewhere across the country, a chronically high and maldistributed burden of comorbidities shaped viral outcomes. Yet, as SARS-CoV-2 became the overwhelming object of epidemiological focus, any accounting for the complexity of multimorbidity and its underlying web of causation was foreclosed. The viral agent took over as the lead actor because in the pandemic narrative, all excess mortality was tied to the spread of the novel viral pathogen. What was effaced in this narrative was the story about the production of co-morbidities that actually underpinned higher death rates, the toxic foods and chemical exposures, the racism baked into the US health care system at every level— all of which have contributed to a long and steady state of debilitation and slow death (Livingston, 2020). Rising slowly, creeping up over so many decades, the counting of co-morbidities and their causes became normalized as static variables rather than as causal of morbidity in and of themselves (Adams, 2020; Caduff, 2020).

The organization of data into globally and regionally comparative sets meant to signal rising and falling rates of peril and burdens of loss in a given city, province, or nation formed scalar operations that effaced the hierarchies of risk and disposibility within any given population. Risk factors that were tied to social inequalities remained largely invisible in the daily accounting of morbidity and deaths that circulated as policy-making instruments. For example, the daily accounted figure of hospital deaths through which New York was compared to Chicago or Little Rock or Milan, obscured the maldistribution of hospital mortality within the city. Some chronically under-resourced hospitals in neighborhoods that were home to disproportionate numbers of "essential workers" had much higher mortality rates than more capitalized hospitals in wealthier neighborhoods. In the publicly reported metrics, morbidities of so-called "essential workers" who were unable to quarantine were lumped in with those whose morbidities were a consequence of other risk exposures (Livingston 2022). What if the numbers had focused on how these subpopulations were over-exposed to the virus in relation to basic social inequalities of labor and wealth? How might our ability to understand the pandemic, and to generate effective responses, have been different if our counting practices had offered more subtle distinctions based on the social contours of risk that preceed and outlive the virus?

It is true that eventually some efforts were made to locate high risk populations in residential institutions. Specifically, nursing home cases and deaths were counted alongside those in city jails and state prisons. A portion of the pandemic was now metrically and materially sealed off from the general public in these institutions. Visiting was suspended to either kind of institution, and relatives worried from a distance, imagining worst case stories spun from the metrics. Despite their radically different positions vis a vis one another, staff and elderly nursing home residents; guards and incarcerated persons, shared in the high rates of infection and carried

the taint of social death. The sealing off of metrics into institutional sub-epidemics here glossed crass questions and equally crass answers. Once we had the numbers, did this counting lead to efforts to improve conditions of living at such places? No. They too were wrapped around the narrative of viral exposure, and questions about whether a death in a nursing home *counted* the same as death among the 'general' public.

Epidemiologists did eventually try to isolate key variables or expressions for quantification, to examine factors in isolation and then in modeled, abstract combinations. But the modeling of the pandemic as singular *event*, albeit a highly complex and multifactoral one built out of big, dynamic, and complex data sets, bounded the story of the pandemic from the bigger story of disaster in which it sat. Suspended from the narrative, or relegated to its margins, was the refugee crisis that months before SARS-CoV-2 had been the subject of much metricization, even as the pandemic demonstrated that it was the air travel of the wealthy and not the rubber boats of the poor and displaced that spread disease and economic turmoil. The fires, the hurricanes, the plastic-choked oceans, and the sixth extinction were held off stage as causal relations of the pandemic death march. The viral narrative could not hold simultaneously damning evidence of bleach, the cleaning chemicals, the thousands upon thousands of tons of disposable everything whose availability was suddenly all the more important for safety than harm, metricized as proxies for political efficacy. The stock market ticker tape and the metrics of death and devastation continued to diverge, lurching forward toward the uptick in corporate profits on the mere premise (with no actual evidence) that technical tools like vaccines were just around the corner.

The metrics of COVID-19 thus operated as instruments that concealed some realities while conjuring others as acts of artifice, driving forward the industrial complex of free-market

competitors perched to 'rescue' populations under the rubric of emergency spending and social lockdowns, while simultaneously making it harder to see how transmission dovetailed with pre-existing health and existential risk. What was missed in all this counting, however, were the emerging realities that did not fit the disaster-event narrative form. Consider the multitudes of those whose symptoms of COVID-19 lingered, whose experience of the virus was chronic rather than acute.

For those with what became named 'long COVID,' navigating their illness required wading through metrical indicators that were most often shown as either cases or deaths, initially leaving such patients unaccounted. The quest for 'true' numbers required deciphering uncertainties produced through testing technologies, sampling strategies and attribution of fatalities to the virus. Though abstract, population level statistical data were instructive to individuals with symptoms hoping to understand and anticipate the effects of the virus as an embodied experience. What did it mean to become a 'case,' and how might one anticipate becoming a 'death'? The conferring of a disease label, traditionally understood to enable access to both information—about the trajectory and ways to manage a disease— and treatment, were confounded by the sea of metrics that circulated already. The first challenge for many with symptoms was in accessing such a disease label, not only because the testing rules were uncertain but also because testing was unreliable, especially for those whose illness exceeded the 14-day expected symptom window. Symptomatic people were consistently turned away by health care services, left without the information or treatment they hoped to receive (see Callard, 2020; Greenhalgh et al., 2020).

The self-diagnosed soon became a sizable proportion of COVID-19 'cases,' joining those with official diagnoses in turning to social media to decipher their experience and produce

collective knowledge, including metricized data, in a manner familiar from patient experiences

of other "contested illnesses" (Dumes, 2019; Rogers, 2022; Murphy, 2006). Online forums for

people experiencing COVID-19 appeared on Facebook, Slack and other online community

platforms early on in the pandemic and quickly accumulated thousands of members from all

around the world. Reports of alarming pulmonary, heart and neurological symptoms, among

other things, began to float across the internet as people with symptoms tried to make sense of

their altered bodies and lives. The COVID-19 Body Politic Slack Group (2020), for instance,

polled 640 respondents at the end of April 2020 at a point when symptoms for most respondents

were ongoing, averaging 40 days according to its survey. Sharing experiences to cross-check

their own status, to seek reassurance and gain support for deciphering medical systems, members

collectively formulated a metrical image of the disease that differed from those offered by

medical experts. Members crowd-sourced data to create their own epidemiological analyses of

the nature and trajectories of symptoms. Both of these dimensions—visceral and temporal—were

notably encountered, narrated and calibrated through crowdsourced metrics.

Here too, we call attention to the way that the viral narrative that circulating alongside

metrics of COVID morbidity and mortality—one that presented it as a once in a century event

that would be conquered by vaccines and good behavior—made it hard to hear those whose

experience of the disease did not fit the mold of the time-limited event. Like the chronic

morbidities that were treated as 'static' in the figuration of the virus's ebb and flow but not really

counted, those whose experience of COVID-19 did not subside after the prescribed prognosis

found themselves neglected. In order to be seen, they had to bootstrap their own metrics and

force their experiences into public visibility. The metrics, too, co-constituted the pandemic and

the experience of it.

Coda

On May 5, 2023, the World Health Organization declared an end to the Global Public Health Emergency, three years after the SARS-C0V-2 virus appeared on the radar of epidemiologists, and even though the death toll of nearly 7 million people continued its (now slower) rise. Looking back, it would be hard to deny that the COVID-19 pandemic was a once-in-a-century event. To what degree that exceptionality was a feature of the virus's trajectory across populations and place and to what extent it was an artifact of the metrical storm through which the pandemic made landfall is now impossible to decipher. The coronavirus remains a total social fact—a tangled nexus of metrical and viral information, of political calculation and public affect, organizing and orchestrating new global realities.

Here we have reflected on some of the metrics of COVID-19 in relation to their affective potencies and their narrative opportunities, misdirections and erasures. In doing so, we have tried to focus how metrics co-constituted the pandemic in conversation with the virus as well as the capacity of metrics to engage the public in ways that cannot be contained, and their forging of narrative arcs that tell some stories while excluding others. Our hope is that by interrogating the pandemic in this way, we have also added more to the anthropological analysis of how metrics work in our pandemic times. Pandemic metrics persist, haunting the present, waiting to offer prognostications of return or of an altogether new outbreak. At a minimum, we suggest that a critical interrogation of the metrics at work in the COVID-19 pandemic makes it clear that the experience of COVID-19 was as much an experience of the metrics as it was of the virus.

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