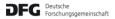# Carolin Mezes

Monitoring Pandemic Preparedness

Global Health Security's Politics of Accountability, Development, and Infrastructure

campus

Monitoring Pandemic Preparedness

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Introduction

The Failure of Preparedness Monitoring

This is a study about pandemic preparedness monitoring, the practice of evaluating, assessing, and measuring those capacities of health systems which are believed to enable countries to better manage epidemic and pandemic events. For many years, pandemic preparedness has been at the center of the global governance effort of global health security. Ever since the 1990s, the notion of pandemic preparedness and health security has shifted priorities in the field of international health collaboration, reformed international health law and the role of the World Health Organization, initiated new networks and institutions of global public health, and reoriented priorities for charities and NGOs. Within the governance and diplomacy arenas of the international community, pandemic preparedness has been established as an important obligation of countries. Accordingly, the monitoring of the development of preparedness capacities has become an important cornerstone of the multi-actor project of global health security. Global health security is imagined to unfold as a decentralized but concerted process of closing those infrastructural gaps in health systems which might threaten a swift and competent response to health events and thereby endanger lives as well as economic stability all over the globe. Preparedness monitoring is supposed to be the means of informing and steering this successive process of infrastructural build-up. By now, a variety of actors engage in the practice of assessing the preparedness capacities of countries, using different measures of monitoring and producing different forms of knowledge and data. The overall goal of this practice is to foster accountability for countries' efforts to prepare for pandemics and to achieve a development towards more resilient health systems. This research investigates this preparedness accountability practice – its means, effects, failures, successes, and misunderstandings – as part of global health security governance.

Although the COVID-19 pandemic disrupted and catalyzed a variety of developments in the field of global health, especially the practice of preparedness monitoring has gained attention. This was the case because the established measures of preparedness seemed to have failed rather spectacularly: the countries ranked highest on the preparedness scales also ranked highest for numbers of infections and deaths of COVID-19. Being evaluated as "well prepared" did not seem to coincide with a pandemic response performance that was able to keep the numbers of deaths and infections low. Accordingly, the value and the form of the knowledge produced by existing preparedness monitoring measures has come into question, not just from the perspective of critical voices commenting on the programs and means of global health security but also from voices from within the governance efforts, which appreciate preparedness monitoring as an important instrument to improve global health. Nevertheless, in the moment of it being discussed most critically, preparedness monitoring was not abandoned. Rather, it was reinstated through the introduction of yet another procedure, the Universal Health and Preparedness Review, which is going to be positioned even more prominently within the shifting legal-administrative governance arrangements of global health security.

A number of questions have been raised in the context of this – for many, paradoxical and disappointing – development: Why have so many people been infected and have died in high-income and highly prepared countries too, oftentimes in higher numbers than in supposedly less prepared countries? What exactly is being monitored in preparedness monitoring, and which expectations can reasonably be attached to the knowledge produced in preparedness monitoring? Does preparedness monitoring *predict* the pandemic response performance and resilience of countries? Does it actually help to close preparedness gaps? If not, what is the value and the function of preparedness monitoring, for individual countries and within the governance architecture of global health security?

By answering some of these questions, this study argues, based on document analysis, ethnographical observations, and interview material, that global pandemic preparedness is a paradoxical effort of infrastructural development. Preparedness monitoring operates by means of an infrastructural problematization: it urges to build up infrastructures for preparedness data, transparency, and accountability, and aims to foster and develop health systems infrastructures. This book traces the ways preparedness monitoring

builds on the (modernist) promise of infrastructure and development, and discusses how and why this promise fails.

Approaching global health security and preparedness governance as an infrastructural governance effort is not new; rather, it builds on existing literature along these lines and picks up long-standing tropes of (critical) global health: that there is an unmet need for more 'structural solutions' and for stronger investment in health systems infrastructures. This critique is most visibly reiterated in the context of epidemic and pandemic events, and the focus of this investigation rests on the developments in the time between the Ebola virus epidemic in West Africa in 2014–16 and approximately mid-2022. As this research has been conducted from 2018 to mid-2022, it has witnessed turbulent times for the field of global health: the SARS-CoV-2 pandemic appeared to be the ultimate "stress test" for the health security governance architecture, which had consolidated since the revised International Health Regulations entered into force in 2007. While I was finishing this manuscript in 2023 and 2024, the developments toward amending the existing legal apparatus and implementing a new international preparedness review were still ongoing.

Overall, my following analysis is carried by an interest in power dynamics and in the conditions of inequity which characterize global health and global health security. To the relevant sociological and anthropological literature this study adds a twofold description of the peculiar infrastructuralism that characterizes preparedness governance: Part I lays out an event-based genealogy of the successive establishment of preparedness monitoring. It traces the development of the practice in relation to those health crises and outbreak events which cyclically have catalyzed changes in the global health security governance architecture and have introduced new preparedness and preparedness monitoring efforts. Such an event-absed genealogy highlights how power relations and the reach of certain and not other actors shape the implementation of preparedness monitoring and its technologies. Part II complements this account with an ethnographic case study and scrutinizes one of the most important preparedness monitoring measures, the Joint External Evaluations (JEE). Here, thick ethnographical descriptions give an account of the logics and the tensions that characterize the infrastructural promise of preparedness and preparedness monitoring. Based on my ethnographical observations, I argue that the process is characterized by the technocratic and modernist assumption about the universality and the effectiveness of administrative paperwork and media infrastructures. This

allows me to pick up and nuance one of the core critiques of preparedness monitoring: that this transparency practice monitors the *capacity to produce evidence* for preparedness capacities, i.e. paperwork, rather than the actual preparedness capacities.

Preparedness Monitoring as Infrastructural Inversion

The following research is anchored in two related and interdisciplinary fields of scholarship. These are, on the one hand, social science investigations, which have discussed the rise of formats of transparency and monitoring in (global) governance, the so-called "audit culture" or "evaluation society" (e.g. Power 1996; Dahler-Larsen 2011). And on the other, studies on infrastructure. Building on this scholarship, I anchor the analysis in the premise that, firstly, preparedness monitoring is an *accountability practice*, situated in the inherently unequal power relations that characterize global health, and secondly that it is an *infrastructural inversion*, a "turning" of attention to those underlying structures enabling public provision and a reliable state, or any socio-material structure that enables another socio-material structure or process.

The first anchor point in the field of social science studies on transparency and monitoring in global governance has observed the rise of accountability formats in public and global governance, in particular the so-called "audit explosion" since the 1990s: a proliferation of the practices of audit, assessment, evaluation, ranking, and so forth (ibid.). It has been discussed how, by now, these formats are applied as means of knowledge production for nearly every problem of control and governance imaginable. Preparedness monitoring aims to produce *accounts* of how well countries are prepared for a pandemic. As an *accounting practice*, preparedness monitoring is supposed to unfold a culture of *accountability* toward the objectives of health security. Like the many case studies of audit practices, this study, too, benefits from reference to Foucauldian concepts and work from governmentality studies (Rose, O'Malley, and Valverde 2006; Lemke 2001). I approach the accounting practice of preparedness monitoring as part of the overall assemblage of global health, security, and governance and understand it as a problem of *government*. As Nicolas Rose and Steve Miller put it in their readings of Michel Foucault's work on liberal power, biopolitics, and governmentality:

"[g]overnment is the historically constituted matrix within which are articulated all those dreams, schemes, strategies and maneuvers of authorities that seek to shape the beliefs and conduct of others in desired directions by acting upon their will, their circumstances or their environment" (Rose and Miller 1992, 195).

In this framework, preparedness monitoring is understood as a specific *problematization*: the question for analysis is, then, how "global health security" and "global pandemic preparedness" became a governmental problem; accordingly, how preparedness monitoring was established as a technological means to make this problem governable.

Typically, an analysis of government and its problematizations turns to the *rationalities*, the inherent logics and truths that inform its guiding knowledge and programmatic statements, and to its *technologies*, "the complex of mundane programs, calculations, techniques, apparatuses, documents and procedures through which authorities seek to embody and give effect to governmental ambitions" (Rose and Miller 1992, 195). In line with the notion of genealogy as an approach to understand matters of concern as historically grown effects of power constellations, Part I introduces the well-researched programmatic *rationalities* of global health security: the notion of a shared and interconnected global space of infectious threat, in a time of emerging infectious diseases. Using an event-based genealogy, I engage with this early programmatic discourse around preparedness and health security, as well as with the perceived failure of preparedness monitoring in the COVID-19 pandemic. This critical discussion of the limits of preparedness monitoring pursues, by way of discourse analysis, the *rationalities* of preparedness. However, the majority of my research is concerned with the *technologies* of preparedness governance and preparedness monitoring, the complex of means and measures by which the governmental ambition of pandemic preparedness is pursued. To provide a description of the accountability practice of preparedness monitoring, this study dwells on the "technicalities" (Riles 2005) of evaluation and monitoring.

Secondly, next to the focus on rationalities and technologies of the governmental project of preparedness monitoring and accountability, this study is anchored in scholarship on infrastructure (e.g. Harvey, Jensen, and Morita 2017a; Bowker and Star 2000). Pandemic preparedness is an infrastructural project and pursues an infrastructural goal: the build-up of health system capacities to deal with health events. Accordingly, it has been discussed as a practice of resilience, vital systems security, and critical infrastructure protection (Collier and Lakoff 2014). I build on this research but also on the

wider field of scholarship, which has recently "turned to" infrastructure. Far beyond the biopolitics and security questions which are central to analysis in the wake of Foucault's work on power and government, infrastructure has become a much-discussed topic in social science investigations, and has thereby inspired empirical and conceptual work (e.g. Anand, Gupta, and Appel 2018). I draw from these discussions not least as a means to think with, and follow a relational understanding of infrastructure, infrastructuring, and infrastructuralism. Introducing some of the main analytical considerations from the wide field of the studies of infrastructure (chapter 1) allows me to pose the governmental question of preparedness monitoring under infrastructural terms: *How does preparedness monitoring address infrastructure as a matter of government, and which infrastructures are being problematized? At the same time, on which infrastructures does preparedness monitoring depend itself: by way of which technological formats, relying on which enabling media infrastructures, is preparedness monitoring facilitated as a means of global governance?*

This gesture of asking the infrastructural question both ways – the infrastructures problematized in preparedness monitoring and the infrastructures enabling preparedness monitoring – is borrowed from analyses in the wake of science and technology studies (STS) and actor-network theory (ANT), which have productively institutionalized a research interest in the materiality of knowledge production, science, and government. Crucially, pandemic preparedness and pandemic preparedness monitoring perform what has been called an "infrastructural inversion" (Schüttpelz 2008; G. Bowker 1994; Appel, Anand, and Gupta 2018): a turn to those socio-material conditions which enable and secure an indispensable service or performance. My analysis performs such an infrastructural inversion as well, by turning to those socio-material conditions and technological networks that enable preparedness governance and monitoring.

Different infrastructural modalities of global pandemic preparedness governance are taken into view by this analytical infrastructural inversion: the governance architecture and legal infrastructure, the infrastructures of knowledge production, as well as the media infrastructures operating preparedness. The *legal and administrative infrastructures* of preparedness governance are of interest because they constitute and frame what usually is described as the "architecture" of health security. Specifically, the World Health Organization (WHO) and the International Health Regulations (IHR) will be of relevance as organizational and legal moorings. Furthermore, the *infrastructures of the monitoring practice itself* are taken into view, as they

enable and shape both the process of knowledge production as well as the circulation of preparedness monitoring data. Specific examples are the Global Health Security Agenda questionnaires, the WHO's Joint External Evaluations (JEE) and their "Evaluation Tool", or the Global Health Security Index and its indicator ranking. Of interest are the technical frameworks, methodologies and media technologies of these measures, as well as the contexts of their design, the ways of their deployment, and the representational media that transport preparedness monitoring data. Further deepening the focus on underlying material infrastructures, the analysis will furthermore show that *mundane media and paperwork infrastructures* play an important role for the facilitation of preparedness monitoring measures: tables, check lists, to do lists, pdfs, PowerPoint presentations, standard operating procedures, laminated call lists, and so forth. A close look at these paperwork and inscription technologies and the respective administrative practices allows to work out the political effects emanating from the practice of preparedness monitoring.

Overall, the infrastructural modalities taken into view in this study are not closed-off levels or scales of analysis, but are part of the same socio-material network which is of concern for this investigation. Zooming in and out on infrastructural modalities from "macro" (the governance architecture) to "micro" (the material paperwork practice of planning and documenting) allows us to understand the infrastructuralism of global pandemic preparedness governance as an inherently modernist project of development and state building.

Arguments and Chapter Overview

Against the background of an ethnographical vignette on "taps and toilets", chapter 1 explains the core infrastructural paradox that pandemic preparedness operates by: it scrutinizes infrastructure but also works around the overall infrastructural problem it securitizes. Building on this infrastructural problematization, I lay out the analytical framework of this study, which rests on four core motifs of the recently proliferating studies of infrastructure. Here readers will also find methodological considerations concerning field work, anonymization, terminology, the pandemic constraints, and so forth.

Part I of this study pursues an event-based genealogy and discusses preparedness monitoring in the context of the successive development

of global health security's governance architecture: it traces the "lessons learned" from health events. Chapter 2 starts this by tracing the shift of the initial problematization of infrastructures for global *outbreak surveillance* to increasingly include wider preparedness capacities of health systems in the rationale and build up infrastructures and routines for *preparedness monitoring*. Building on well-established narratives of the emergence of health security in the discourse on emerging infectious diseases and a new worldview of pandemic threat, chapter 2 describes how a chain of highly problematized outbreak events has catalyzed the evolution of the juridico-administrative infrastructure of global health security and preparedness monitoring. The West African Ebola virus disease epidemic and the COVID-19 pandemic mark the most salient impulses in a dynamic which introduced different formats and media of preparedness monitoring into the governance apparatus. In addition to the initial "lesson" on emerging infectious diseases – the implementation of the legal regime around the International Health Regulations – it is therefore of interest how the "Ebola lesson" intensified the perceived need for monitoring activities. In particular the discourse around Ebola has catalyzed preparedness monitoring, and I discuss the introduction of the different monitoring media – the Global Health Security Agenda questionnaires, the Joint External Evaluations, the Global Health Security Index, various media like preparedness maps and integrated data platforms – as part of the continuous development of a governance landscape. I make a point of the struggles of power and influence that characterize this field and show that often WHO's decisions were driven by other actors' interventions in the field, particularly regarding the introduction of new methodologies for preparedness monitoring. A concluding section in chapter 2 considers the epistemological scope of the transparency politics of preparedness monitoring developed in the course of the "EID" and the "Ebola lesson". I describe the politics of the "view of the preparedness map": a contradictive "non-competitive competition" between sovereign states, building on nationalist and modernist pride about infrastructural strength, development, and progress.

Chapter 3 proceeds with "lessons learned" and discusses three specific lessons of COVID-19. Picking up on the main problematizations which surfaced in the pandemic, analysis turns to three related issues. First, I discuss the obvious "measurement gap" of preparedness monitoring. This includes the failure of preparedness monitoring to "predict" a country's pandemic response, as well as the fact that preparedness metrics are not to be taken for

classic biopolitical metrics of global health (3.1). Further, I discuss the failure of the governance architecture and the struggle of WHO to stay afloat in the current of the pandemic dynamic. Here I argue that the characteristic mode of "ad-hoc preparedness" that drives the much criticized "cycle of panic and neglect" is the actual mode of operation rather than the failure of preparedness. Also, I show that the typical momentum of governing through crisis enables the fragmentation of the governance landscape that, too, is much criticized but is functional for powerful "stake holders" in the field (3.2). The third "COVID-19 lesson" of interest in this research is the (un)surprising introduction of a new preparedness assessment in the moment of preparedness monitoring's failure. Building on literature on the model process of the new "Universal Health and Preparedness Review" I introduce classic sociological arguments about the functionality of "ritual evaluation" (Meyer and Rowan 1977). This allows me to outline the contradictive relation of preparedness accountability's success and failure (3.3).

Complementing the genealogy of preparedness monitoring, Part II of this study takes a close look at one measure of preparedness monitoring in particular: the Joint External Evaluations (chapters 4 and 5). The evaluations are facilitated by the World Health Organization and have been one of the first and one of the most important monitoring measures, not least because many other measures build on their data. Through ethnographic observation of two Joint External Evaluations, one in a low-income and one in a high-income country, I add a detailed case study to the existing literature on preparedness monitoring.

Guided by the analytical gesture of infrastructural inversion, I turn my attention to those underlying technologies and enabling media infrastructures that facilitate the evaluation. Chapter 4 lays out the overall process and introduces readers to the core technology of the evaluation, the so-called "JEE Tool". This indicator catalogue translates the demands made by the legal text of the IHR into measureable preparedness capacities. It also guides the "joint" decision-making process, about the degrees of capacity and the appropriate scoring for the respective indicators. By way of a dense ethnographical vignette, chapter 4 describes the core moment of decision making and how it builds on media infrastructures. This allows me to point out that the JEE process enacts three different and often contradicting modes of operation: it aims at *objective knowledge* production and "mechanical objectivity", it guides a *soft-law procedure* for the normative and moralized

practice of preparedness accountability, and it aims to steer a continuous *process of development*, by putting out a development plan for health security infrastructures in form of mission reports.

Having explained the basics of the procedure and having thereby pointed to the tensions and frictions of the process, chapter 5 deepens the infrastructural inversion. First, it zooms in on the *indicator technology* that informs the knowledge production as well as the soft-law character of the procedure (5.1). It further makes an argument about the underlying technical blueprint of the so-called *"Capability Maturity Model"*, a widely used model for organizational process development in the business world. It strongly informs the JEE process and particularly the infrastructural developmentalism inherent in it (5.2). Lastly: because of the procedure's emphasis on *paperwork practice and media of administrative planning* (lists, standard operating procedures, plans, and so forth), preparedness monitoring unfolds as a project of administrative development and state building (5.3). As I will show, in the JEE process, preparedness is enacted as the development of administrative capacities of countries.

By way of a close-knit media-ethnographical approach, part II allows me to highlight that preparedness monitoring is indeed a "box-checking exercise" limited by the problem of "performative visibility" (Mahajan 2021). However, building on actor-network theory, it also shows that paperwork is considered crucial not only for preparedness monitoring's transparency politics but also for the issue of preparedness itself. The role of media infrastructures corresponds to the oscillating character of preparedness as both a *material practice* and a *virtual organizational capacity*. This argument is developed along the lines of core tenets of actor-network theory, an approach which itself has been discussed as an analytical infrastructural inversion and therefore provides a particular opportunity to critically reflect on the modernist promise of infrastructure, preparedness, and development.

Finally, in my concluding remarks I propose terms to grasp the specific reach of the efforts of pandemic preparedness monitoring. I understand the governance apparatus of global health security as a successor of earlier so-called *structural adjustments* in global health, which now addresses, both in the mode of reflex and reflection, the attrition and inadequacy of health infrastructure and systems of provision as an issue of security. It arguably does so without actually addressing infrastructural needs. The infrastructural promise of global health security remains unfulfilled, although *infrastructural adjust-*

ments take place. Global health security and pandemic preparedness governance appear as a de-centralized, vertical program of infrastructural adjustment.

1. Analyzing Preparedness Monitoring as Infrastructural Inversion

To get started, the first chapter draws readers into the infrastructural problematic of preparedness monitoring by way of an empirical vignette from ethnographical observations which I have undertaken for this research. From there, it unfolds the conceptual frame of infrastructural analytics, situates this study within the relevant literature, and discusses the methodological approaches, as well as the conditions of conducting this research during the COVID-19 pandemic.

1.1 Infrastructure Problems. An Ethnographical Vignette on Taps and Toilets

It is Thursday morning, day 4 of a Joint External Evaluation. Day 4 is "site visit day". The external experts who came to the country for the evaluation week are scheduled to visit different sites which are important for global health security and accordingly of interest for the Joint External Evaluations. These are, for example, the country's main airport as one of the country's "designated points of entry" under the International Health Regulations, the main high-security laboratories, or the facilities where nuclear and chemical events would be registered and responded to. As an independent observer of the evaluation, I am generously allowed to take part in the site visits and join a group headed to two destinations: first a regional hospital nearby, where one of the country's larger laboratories is located, then the central medical storage for medication, vaccines, and catastrophe supplies.

In the car, I have a conversation with Jamie, who takes part in the evaluation as an expert from WHO. His technical area of expertise is case reporting. He explains to me that, rather than being "inspections" of the local administrative staff, site visits are supposed to help the external experts of the evaluation to "complement" the impression that they were able to get during the first three days of the evaluation week just by reading and discussing documents and spread sheets. Seeing the capacities evaluated in the JEE not only on paper but also on site allows him and the other evaluation experts *to get a better idea of what's actually going on, on the ground*. He is looking forward to *getting a better picture of what we are talking about*.

At the hospital, we are led to the director's office, where a polite and hesitant conversation between the evaluation experts and the hospital director takes place. The hospital director introduces us to Joan, the head nurse responsible for the hospital's measures against antimicrobial resistance. Just the week before, she returned from a quality management training in Heidelberg, Germany – a proud example of the health development partnerships the country engages in. However, she is invited to the conversation not only to showcase the hospital's efforts to educate staff and to make use of international health development cooperations. Rather, her newly acquired and certified expertise in antimicrobial resistance is an important technical matter in the Joint External Evaluation's framework, and evaluators take the opportunity to ask a number of detailed questions. Approaching the end of the conversation, one of the experts from our group asks in the spirit of inclusivity if Joan had any comments for the evaluation team to consider: *Is there anything you would like to add?*

Slowly, and after exchanging polite smiles with the hospital director, Joan answers:

Well... you know we have a hundred people for two toilets. And the hospital's wards only have water taps and buckets. But no sewage. We hardly manage with the number of patients right now. And right now it's not even a seasonal outbreak, when we would have much more patients...

Jamie and the other visitors from the JEE group thank Joan for making her point and the conversation ends on a knowing and consenting note of *well ... it's complicated*.

Next, we are invited to see the hospital's central laboratory. During the short tour of the room, equipped with machines and computers, staff explain to us the many procedures they are able to perform as one of the rare facilities in the country and that they take pride in their high number of female professionals in the lab. *"The lab is America – and the rest of the hospital is our country"*, they say, laughing.

After the obligatory group picture with the lab team, we are sent on our way. However, on the way out of the hospital, we pass through one of the patient wards and its central counter, where nurses and doctors coordinate administrative matters. This is Jamie's moment to seize the opportunity: he asks to take a look at the patient ward's case registers to get a better impression of the on-the-ground routines of disease reporting. We are presented with a large notebook, listing cases of the different diseases, which have been diagnosed in the hospital during the last weeks. Some of these diseases are notifiable diseases and will have to be reported to authorities within the country, as well as to WHO. Jamie takes a look at the hand-written lists (not without covering patient names for anonymization) and listens to what the ward's nurse tells him about the transcription from the notebook into the digital registers, which are linked to the national public health institute and the ministry of health.

As we make our way out of the hospital and discuss impressions of this first site visit of our day, the group agrees that the hospital seems well run, as *"not even the patient wards were smelly"*. Jamie remarks, however, that he has seen several cases of notifiable diseases in the notebook and is not convinced that reporting to the health ministry, national public health institute, and WHO is conducted as it should. This would be a case for possible training on case reporting, he explains. As the group stands in the parking lot and exchanges thoughts, a small bottle of hand sanitizer gel is handed around casually before we get in the car to make our way to the national medical storage, the next site visit on our schedule.

This ethnographical vignette was produced in the course of participant observations of a Joint External Evaluation, a preparedness assessment facilitated by WHO. Much can be gained from this glimpse into the standardized

procedures of pandemic preparedness assessment: questions of global in-equity and of cultural dominance, of gender politics, of international health development collaboration, of infrastructural and administrative exclusion, of the impossibility to live up to the reality "on the ground" in yet another one-week evaluation, yet another mission report (or yet another ethnographical vignette), and many aspects more.

    As an introduction to this research on preparedness monitoring, I posi-tion this vignette here to highlight what the project of health security and preparedness governance is about. It is about certain notifiable diseases, about the capacities of hospital labs to process them, about the transfor-mation of hand-written lists into digital registers, about the routines of case reporting, the communication channels between the hospital, the country's health ministry and national health institute, and about standard operating procedures of managing antimicrobial resistance in health care facilities. What it is not about is *taps and toilets*. Global health security turns to infrastructure, but only to certain kinds, in a certain way. Global health security does not actually target infrastructural matters like sewage systems and the number of trained staff in a regional hospital. The Joint External Evaluation procedure observed here does not ask if there are functioning roads to transport sick people to the hospital or infectious specimens to the laboratory, or if there is a stable power supply to process such specimens in the machines financed through health development cooperations. Health security is not necessarily interested in health care systems; rather, it is interested in *certain* aspects at the intersection of clinical health care and public health. Even though there are indicators in the Joint External Evalu-ations technical framework that try to address the topics of workforce or of budgeting, global health security is not explicitly directed at the infrastruc-tural problem, which interview partners call "general structural weakness", "structural deficits", or the "neoliberal deprivation of public service" (cutting across the Global North and South). And lastly, formats of preparedness monitoring like the Joint External Evaluation are not about what nurse Joan or the hospital director have to add to the conversation: of course, the final report of this JEE did not make a note to build basic sewage systems in the country's health care facilities. This is the case because pandemic prepared-ness, as enacted in the current health security governance arrangements, is indeed *not* explicitly or straightforwardly discussed as "infrastructure". An approach via infrastructure, building on existing literature discussing

global health security as a matter of vital systems and critical infrastructure, does not match an infrastructure discourse in the field, as such.

Scholarship has discussed how different infrastructural logics are at work in different global health efforts. A broad overview of different programmatic efforts of closing gaps in health systems, which are based on different problematizations of risk and need, allows us to distinguish global health security and the character of its limited infrastructuralism. Andrew Lakoff has distinguished two regimes of global health, which both reflexively respond to an infrastructural need. *Global health security* aims at fostering those aspects of public health systems which are supposed to allow a country and the global community to deal with the threat of unknown emerging infectious diseases (like COVID-19). "*Humanitarian biomedicine*", on the other hand, differs from health security because its focus is on dealing with diseases that afflict poorer populations in the world. "Whereas global health security develops prophylaxis against potential threats at home, humanitarian biomedicine invests resources to mitigate present suffering in other places" (Lakoff 2010, 59). Both regimes react to a perceived lack of infrastructure: of early warning systems and emergency plans for example, or of basic health care facilities in low-resource settings. Both regimes pursue a limited and differentiated infrastructuralism themselves: Global health security aims to build up those basic capacities that are considered necessary to collectively survive unpredictable disease outbreaks; humanitarian biomedicine packs and unpacks mobile infrastructures to close the most urgent gaps in health care systems in situations of disease outbreak, usually in settings of "structural weakness" (Redfield 2008).

Another approach, which contrasts with health security and humanitarian biomedicine but is invested in the problem of systemic and structural gaps, is the notion of so-called *"health system strengthening"*. For example, WHO has developed frameworks for this governance goal. These aim to strengthen health systems along the six building blocks of service delivery, health workforce, health information systems, medical products, health financing, and leadership and governance (Wenham et al. 2019). Critical commentary holds, however, that "there is little, if any consensus on what [health system strengthening] entails" (Storeng and Mishra 2014). Further, it has been shown that an agenda of "holistically" fostering health systems, too, can be infused or co-opted by approaches which focus more on vertical, targeted, and technical solutions that make it possible to work around the

gaps and weaknesses within health systems (Storeng 2014). Also, generally, the programmatic reach or authority of health system strengthening by no means compares to that of global health security. As chapter 2 and 3 will explain, institutional networks of influential actors and a form of lobbying or a concerted push for an "agenda" of global health security were vital for its ongoing institutionalization. No comparable networks and interventions exist for the goal of overall health system strengthening. Scholars have tried to relate and compare the goals of global health security, universal health coverage, and health system strengthening. Laying out the overlap between them, for example Wenham et al. have argued that health system strengthening "can be the policy mechanism which brings GHS and UHC together, elevating health and mitigating risk for all [...] 'health system strengthening is what we do: UHC, health security and resilience is what we want'" (Wenham et al. 2019, 4; Kutzin and Sparkes 2016).

This study will discuss how the practice of preparedness monitoring works toward these goals of health security and resilience by evaluating and measuring certain capacities of health systems. As the vignette has already pointed out and as an overview of the different infrastructural concerns of different global health governance efforts shows, they clearly problematize a lack of certain infrastructures without explicitly talking about infrastructure. This research takes an interest in why and how global health security turns certain infrastructural capacities of health systems into an issue of security, without an explicit infrastructural discourse. An explicit and broader infrastructural framing, as for example in a notion of health system strengthening, would of course put center stage those global inequalities of which health security is a reflexivization and for which health security is a work-around. Global health security addresses "structural weakness" as a global security threat, without having to address "structural weakness" as such. The question is, therefore, how to analytically grasp the infrastructural logic of global health security, global pandemic preparedness governance, and pandemic preparedness monitoring.

1.2   Infrastructure Analytics. Thinking with Infrastructure

As the vignette about "taps and toilets" and a broad comparison of different global health governance regimes shows: the infrastructural problematique

of global health security demands to make use of the full range of the term "infrastructure". In the following, I will explain how I use "infrastructure" as an analytical approach to pandemic preparedness monitoring in general, and to the monitoring process of the Joint External Evaluations in particular.

Four analytical motifs undergird my analysis of how preparedness monitoring thinks and operates infrastructurally: (i) infrastructure as material enabler of modern collective life, (ii) the infrastructural capacity to stabilize relations, exert power and control and "govern from a distance", (iii) the specific time and developmentalism of infrastructure, and lastly (iv), the gesture of infrastructural inversion. These analytical motifs are central to the by now wide field of infrastructure studies, or infrastructural studies. Crosscutting the disciplines of sociology, cultural anthropology, human geography, and media studies, both *infrastructure studies* in a narrower and *infrastructural thinking* in a wider sense have come to understand their objects of concern as networked, socio-material forms that materialize and shape relations, provision, and connection. The ever-growing scholarship of *infrastructure studies* usually takes certain infrastructures as its object of analysis, delivering general characteristics of such infrastructure objects. Examples are edited volumes (Anand, Gupta, and Appel 2018; Harvey, Jensen, and Morita 2017a) and case studies, for example on infrastructure and democracy in South Africa (Schnitzler 2016) or on water infrastructures in Mumbai (Anand 2017). Furthermore, there are historical studies explaining the intricate connection of infrastructure and modernity (van Laak 2021; Edwards 2003) as well as sociological accounts of an informational network society or the social ordering done by infrastructures (Castells 2006; Barlösius 2019). Also, there is the work this more recent interest in research objects of infrastructure builds on and has emerged from. These are ANT, research in STS, as well as research in the wake of Michel Foucault or Gilles Deleuze. Central concepts, like "dispositif" (Gordon and Foucault 1980, 194), "network", "actor network" (Castells 2006; Latour 2005), "assemblage", "global assemblage", or "global forms" (Ong and Collier 2005; Tim Brown, Craddock, and Ingram 2012), have been described as forms of infrastructural thinking. In what follows, I understand infrastructure in the sense of Andrea Chu's dense summary of *infrastructural thinking*:

"Whether taking the shape of system, network, or assemblage, infrastructures usually have at least two things in common: (1) they configure lines of contact, circulation, and partitioning in social life, and (2) they are distinctly other-regarding in their operation.