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University of Helsinki
Finland

THREAT AND PROTECTION

BOUNDARY-MAKING, CATEGORIZATION AND IDENTIFICATION IN PANDEMIC PREPAREDNESS AND RESPONSE

Jose A. Cañada

ACADEMIC DISSERTATION

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ABSTRACT

In April 2009, the World Health Organization (WHO) declared influenza A H1N1 a public-health emergency of international concern. This event was especially significant for marking the first pandemic outbreak to fall under 2005's new International Health Regulations, an ambitious binding agreement to regulate international health. Since then, other communicable diseases have provoked similar international responses, with Ebola and Zika among the latest examples. Each of them has occasioned scrutiny of the ability of national and international health organisations – the WHO among them – to handle health threats and emergencies situated at global level. Among the issues recurrently rearing their head amid controversy are uniformity in enforcement of international regulations across contexts, promotion of specific lines of research, rapid development of new drugs, the management of local and international health-care workers' activities, and engagement with local populations. One of the main ways in which health organisations respond to the uncertainty generally associated with pandemic threats is through biopreparedness policies – policies that articulate response and resource management mechanisms before a pandemic event is declared or even before its characteristics are known. The thesis examines the discourses and practices of institutional and scientific actors, for greater understanding of how knowledge is constructed and later carried into implementation in such conditions of uncertainty.

The focus is placed on processes of boundary-making, categorisation, and identification. The analysis of how health and scientific institutions identify, categorise, and describe the various human and nonhuman actors involved in pandemic events employs theoretical tools from science and technology studies, Foucauldian approaches, and understandings of the more-than-human in the social sciences. These shed light on the boundaries, categories, and identities at play during pandemic processes as shared among the many humans, animals, and molecular forms of life involved in pandemic events. The approach of assemblage ethnography is engaged with as an aid to navigating digital and material networks of public health from an empirical perspective. Public documents, interviews with public-health professionals, and field visits linked with diverse international organisations are used in combination with items of scientific news and articles from various journals to illuminate how pandemic threats and emergencies unfold.

The empirical work suggests that knowledge-making in institutional and scientific settings always involves notions of threat and protection. In the material analysed, there is a tendency to identify and categorise a given actor as threatening, vulnerable (in need of protection), or expert (able to protect). This argument is unfolded in tandem with discussion of three, interconnected areas of focus in pandemic preparedness and response wherein boundaries are

made: 1) the establishment of governmental stand-by networks, 2) knowledge-making and knowledge-distribution practices, and 3) the conceptualisation and governance of threatening life.

Each of these areas connects with one of the three main lines of analytically grounded argument. Firstly, institutional boundaries are challenged in efforts to construct more prepared governmental networks that are able to protect societies from pandemic threats and emergencies. As these networks emerge mostly in a context of uncertain and virtual threats, they impose a need for threats' identification and characterisation. Secondly, practices of making and distributing knowledge are productive in that they determine the boundaries between expert, vulnerable, and threatening assemblages, creating differentiated communities by regulating who can produce knowledge and who may access it. The third main area of discussion involves how, from a governmental perspective, certain life forms (both human and nonhuman) come to be identified as hybrid threats because of its sociotechnical interactions. Such hybridity is a key element for the design of pandemic governance and response measures. Accordingly, the way in which actors are categorised in terms of threat, vulnerability, and expertise is defined with regard to their engagement with elements such as space, technology, nationality, and gender.

The thesis concludes with discussion of three ways in which boundary-making, categorisation, and identification processes interact with pandemic preparedness and response: 1) by shedding light on the establishment of more-than-human modes of pandemic governance; 2) by drawing attention to the need for portable, permeable, and flexible boundaries between threat and protection; and 3) by considering how boundary-making reinforces intersectional inequalities in international health. These conclusions point to a need to incorporate, from both an academic and a policy perspective, alternative pandemic narratives that pay heed to the intersectional, changing, and situated definitions of threat and protection.

TIIVISTELMÄ

Huhtikuussa 2009, Maailman terveysjärjestö (WHO) julisti A H1N1 -influenssan kansainväliseksi kansanterveyttä uhkaavaksi hätätilaksi. Tämä oli merkittävä tapahtuma, koska kyseessä oli ensimmäinen influenssapandemia, joka alkoi uuden ja kunnianhimoisen kansainvälisen terveyssäännöstön solmimisen (v. 2005) jälkeen. Tästä lähtien muut tarttuvat taudit, joista Ebola ja Zika ovat viimeisimpiä esimerkkejä, ovat aiheuttaneet samanlaisia kansainvälisiä reaktioita. Jokaista näistä pandemioista on seurannut kriittinen tarkastelu kansallisten ja kansainvälisten terveysjärjestöjen, kuten WHO:n, kyvystä käsitellä globaaleja terveysuhkia ja hätätiloja. Kiistanalaisia aiheita ovat olleet muun muassa yhtenäisyys kansainvälisten säädösten toimeenpanossa eri alueilla, tutkimusrahoituksen jakautuminen epätasaisesti, uusien lääkkeiden nopea kehittäminen, paikallisten ja kansainvälisten terveydenhuollon ammattilaisten toiminnan hallinta sekä vuorovaikutus paikallisten yhteisöjen kanssa. Terveysjärjestöjen tyypillisin tapa vastata pandemiariskien epävarmuuteen on luoda varautumislinjauksia, jotka liittyvät biouhkiin. Näissä linjauksissa määritellään reagointitavat ja resurssienhallinta ennen varsinaista pandemiajulistusta tai jopa ennen kuin pandemian erityispiirteet ovat tiedossa. Tässä väitöskirjassa tarkastellaan eri instituutioiden ja tieteellisten toimijoiden diskursseja ja toimintatapoja (pandemiariskien hallinnassa). Tämä lisää ymmärrystä siitä, miten tietoa muodostetaan ja pannaan täytäntöön näissä hyvin epävarmoissa olosuhteissa.

Tutkimus keskittyy siihen, miten rajoja asetetaan sekä miten inhimillisiä ja ei-inhimillisiä toimijoita kategorisoidaan ja identifioidaan. Terveysjärjestöjen ja tieteellisten instituutioiden tapoja tunnistaa, kategorisoida ja kuvailla erilaisia inhimillisiä ja ei-inhimillisiä toimijoita, jotka liittyvät pandeemisiin tapahtumiin, analysoidaan tieteen- ja teknologiantutkimuksen menetelmien, foucaultlaisen lähestymistavan ja yhteiskuntatieteellisen ‘enemmän kuin inhimillistä’ (more-than-human) -ymmärryksen kautta. Näiden avulla valaistaan niitä rajauksia, kategorioita ja identiteettejä, jotka vaikuttavat pandemiaprosessien aikana yhtä lailla niihin liittyvien ihmisten, eläinten ja molekulaaristen elämänmuotojen kanssa. Tutkimus hyödyntää ‘sommitelmaetnografia’ (assemblage ethnography) -lähestymistapaa kansanterveyden digitaalisten ja materiaalisten verkostojen empiirisessä tarkastelussa. Aineisto koostuu julkisista dokumenteista, haastatteluista kansanterveyden asiantuntijoiden kanssa, kenttävierailuista erilaisissa kansainvälisissä organisaatioissa ja kansallisissa hallintoelimissä, tieteellisistä uutisista ja useissa eri tieteellisissä aikakauslehdissä julkaistuista artikkeleista. Näitä analysoidaan selventämään sitä, miten pandeemiset uhat ja hätätilat kehittyvät.

Tutkimus osoittaa, että tiedonmuodostus institutionaalisissa ja tieteellisissä yhteyksissä liittyy aina jollain tavalla käsitykseen uhasta ja

suojelusta. Käytännössä tämä tarkoittaa sitä, että on tyypillistä tunnistaa ja kategorisoida tietty toimija uhkaavaksi, haavoittuvaksi (suojelua tarvitsevaksi), tai asiantuntevaksi (suojeluun kykeneväksi). Tämä tutkimustulos avautuu, kun tarkastellaan pandeemisen varautumisen ja reagointitapojen kolmea toisiinsa liittyvää fokusaluetta, joiden kautta rajoja asetetaan. Näitä ovat: 1) hallinnollisten valmiustilaverkostojen muodostaminen, 2) tiedonmuodostamisen ja tiedonjakamisen käytännöt sekä 3) uhkaavien elämänmuotojen käsitteellistäminen ja hallinnointi. Jokainen näistä kolmesta fokusalueesta liittyy yhteen keskeisistä, aineiston analyysiin perustuvista, väitteistä. Ensiksi, institutionaaliset rajat muuttuvat kyseenalaisiksi, kun yritetään muodostaa paremmin varautuneita hallinnollisia verkostoja, jotka kykenevät suojelemaan yhteiskuntaa pandeemisilta riskeiltä ja hätätiloilta. Koska nämä verkostot muodostuvat usein epävarmojen ja virtuaalisten uhkien konteksteissa, ne luovat tarpeen uhan identifiointiin ja määrittelyyn. Toiseksi, tavat muodostaa ja jakaa tietoa määrittävät rajat asiantuntevien, haavoittuvien ja uhkaavien sommitelmien (assemblage) välillä ja luovat toisistaan erillisiä yhteisöjä säännöstelemällä sitä, kuka saa tuottaa tietoa ja kenellä on pääsy tietoon. Kolmas keskeinen alue kytkeytyy siihen, miten jotkin elämänmuodot (sekä inhimilliset että ei-inhimilliset) identifioidaan hallinnollisesta näkökulmasta hybridiuhiksi, jotka ovat vuorovaikutuksessa toistensa ja teknologioiden kanssa. Hybridisyys on keskeinen tekijä, kun suunnitellaan pandemioiden hallinnointitapoja ja pandemioihin reagointia. Toimijoiden kategorisointi uhan, haavoittuvuuden ja asiantuntijuuden näkökulmasta, määrittyy sen kautta, miten toimijat näyttäytyvät vuorovaikutuksessa teknologioiden, kansallisuuden, sukupuolen sekä sijainnin ja tilan kanssa.

Tämä väitöskirja päättyy pohdintaan kolmesta tavasta, joilla rajojen asettaminen, kategorisointi ja identifiointiprosessit ovat vuorovaikutuksessa pandemioihin varautumisen ja reagointitapojen kanssa: 1) avaamalla enemmän kuin inhimillistä -käytäntöjen muodostamista, jotka liittyvät pandemioiden hallinnointiin, 2) kiinnittämällä huomiota tarpeeseen asettaa muovautuvia, läpäiseviä ja joustavia rajauksia uhkien ja suojelun välille ja 3) tarkastelemalla sitä, miten rajojen asettaminen lisää kansainvälisen terveyden intersektionaalista epäoikeudenmukaisuutta. Nämä johtopäätökset tuovat esiin tarpeen sisällyttää sekä akateemiseen että poliittiseen tarkasteluun vaihtoehtoisia pandemioihin liittyviä narratiiveja, jotka ottavat huomioon intersektionaalisen, muuttuvan ja kontekstisidonnaisen määritelmän uhasta ja suojelusta.

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Offices are not only important because they are places where you can focus better or keep the hundreds of books necessary to write a dissertation. Offices are mostly important because they house research communities and, without sharing a space with those communities, there is no chance for peer-support, mentoring and very much needed after-work beers. In this regard, I have been incredibly lucky. My main house has been Social Psychology and the amazing group of people that have wandered its L shaped hallway throughout the years: Johanna Kronstedt, Katarina Petersson, Janne Kaltiainen, Emma Nortio, Rusten Menard, Eeva Raita, Anneli Portman, Florencia Sortheix, Kate Jurva, Salla Ahola, Annukka Valkeapää, and Tuuli Anna Renvik. Their support and kindness has always been invaluable. Especial mention goes to Satu Venäläinen, Miira Niska, and Antero Olakivi. They have spent hours and hours of their time discussing grandiose and tiny theoretical concerns, showing me how you get a dissertation defended, setting an example and being an inestimable piece in every averted professional-emotional crisis. I could not have done this without them. Inside social psychology, I would also like to thank the Everyday Thinking seminar, which has served as forum for numerous conversations about papers, theories and university life. Thanks to all its members over the years.

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An important recognition goes also to my informants. I thank them for the time they dedicated to talk to me, the efforts they went through to do it and their guidance in what for me often were very intimidating new spaces. I take the chance to give them a message: I take a critical stance towards their work, but I hope they can see this in the right light. I would never go through this effort if I did not think that what they do matters, that their daily efforts to improve the health of the globe and their people are very important. With my critical stance, I hope to contribute to such enterprise.

Now leaving academic spaces, I want to thank friends and family. First, my friends here in Helsinki: Rebe, Soila, Kata, Paula, Noora, Janne, Otso, Heidi, Olli, Marianne M., Marianne A., and Carl. They received me with open arms and helped me build a new life in a new city, giving me many moments of fun. Second, my amazing group of friends all around the world, who have been my

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Helsinki, May 2018
Jose A. Cañada

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ABBREVIATIONS

ANT	Actor-network theory
BSL	Biosafety level
BWC	Biological Weapons Convention
CBM	Confidence-building measure
CBRN	Chemical, biological, radiological, and nuclear
DURC	Dual-use research of concern
EBS	Event-based surveillance
EC	European Commission
ECDC	European Centre for Disease Prevention and Control
EMRO	Eastern Mediterranean Regional Office of the WHO
EU	European Union
GHSA	Global Health Security Agenda
GISN	Global Influenza Surveillance Network
GISRS	Global Influenza Surveillance and Response System
GMO	Genetically modified organism
GOF	Gain-of-function
HDF	Health Declaration Form
HSC	Health Security Committee
IBS	Index-based surveillance
IHR	International Health Regulations (2005)
ISU	Implementation Support Unit
JPA	Joint procurement agreement to procure medical countermeasures
MS	Member states
NFP	National Focal Point
NGO	Non-governmental organisation
NSABB	National Science Advisory Board for Biosecurity
PHEIC	Public health emergency of international concern
PPE	Personal protective equipment
STS	Science and technology studies
THL	Finnish National Institute for Health and Welfare (‘Terveyden ja Hyvinvoinnin Laitos’ in Finnish)
UK	United Kingdom
UN	United Nations
US	United States
WHO	World Health Organization

1 INTRODUCTION

> *I am at Charles de Gaulle Airport, in Paris. Just a week ago, on the 25th of April 2009, the World Health Organization declared the influenza A H1N1 outbreak a Public Health Emergency of International Concern. Near me, somebody sneezes. Someone else is wearing a face mask. I see a poster that informs about precautionary practices and symptoms of the disease. The papers keep reporting on the events. The information I read includes a mixture of scientific knowledge translated into incomplete explanations of the virus for laypersons and alarmist accounts of the rapid spread of the outbreak.*
>
> *Recollections for a Research Diary, May 2009*

At the time of the reflection above, my reaction was mostly affective. Although I tried to grasp all of the various elements dispassionately and think rationally about the connections between them, I always ended up with a strong weight on my chest, awash with a feeling that something bad was happening, something I should be careful about. I was still months away from deciding on the topic of my master's thesis – which would later evolve into the topic of the dissertation you are now reading – but that experience would continue to stand out for me, and it played an important role in my decision. Those elements that acted together to elicit a reaction of fear represent a summary of the elements addressed in this thesis. Here, however, I have managed to cast off that awful feeling in my chest and look at things calmly in efforts to understand how they play out together: how do governance, knowledge, technology, space, and the interactions among different forms of life come to be translated into the situation at that airport? How do we distinguish what is threatening from what is not? In other words, how do those elements come together to establish boundaries of safeness and danger?

This thesis is about how the challenges presented by biological emergencies, whether already onstage or waiting in the wings, are answered with both division and collaboration, about how institutions and experts come together to collaborate with each other in categorising and identifying various forms of life and social collectives in terms of their role in the spread of pandemic threats. Such categories concretise notions of threat and protection. They help us identify certain actors as threatening – as placing at risk the world and the society that experts are trying to protect. On the other hand, we identify others as vulnerable actors deserving of protection, actors belonging to that world and society experts undertake to protect. The division is not a straightforward one, of course, and it has much in common with many other

identities and categories. In fact, a large part of this work is devoted to revealing how the divide – with all the overlaps, shadows, and mutability – is constantly reconfigured through governance, discourses, and practices. Building those boundaries as output of technoscientific and institutional knowledge is just as much fruit of collaboration as it is a matter of division. In short, here **I examine the construction of knowledge and the implementation of biosecurity and biopreparedness at the crossroads of global and local social processes**. **The main argument emerging from my work is that most of that knowledge and the response strategies are constructed around notions of threat and protection.**

With this introductory chapter, I present the context that surrounds biological emergencies and attempt to give a clear picture of the fundamental objectives for the thesis. Firstly, I discuss precisely how pandemic threats are understood for purposes of this work. To do so, I address health threats as viewed mostly from institutional and technoscientific perspectives. These gravitate mainly around two axes: health and security. As some scholars have already argued, the field of global health has undergone a process of securitisation (Hanrieder & Kreuder-Sonnen, 2014; Kelle, 2007)[1]. By taking this perspective, I have focused my research on pandemic threats conceptualised as complex social and technical matters. In the second major section of the chapter, I describe some of the crucial organisations and inter-government agreements that govern health responses to pandemic threats. The information is intended not to be exhaustive but to give a solid overview of the political background against which the empirical material I analyse is set. Thirdly, I expand on my main aim and argument by presenting the research questions and the areas of focus they entail. These three sections serve as a map guiding the reader through the rest of the text, whose structure and scope I will present before moving on to the core of the work.

1.1 BIOSECURITY AND PANDEMIC THREATS: MULTIPLICITY AND OVERLAPPING DEFINITIONS

One of the core concepts I must define before continuing is that of pandemic threat, because it stands at the centre of many of the policies, legal tools, and practices of which I will be speaking. The concept refers to communicable diseases that have pandemic potential. A pandemic, according to the World

[1] This means that the health of national populations has turned into a security matter: if the health of populations is affected, national security too is affected. The idea has generally manifested itself in broader-based inter-sector approaches to health, involving many more actors than just departments of health. This merging of health and security logics has contributed to biological emergencies being increasingly understood in varied ways and deemed relevant to diverse actors – i.e., to their becoming multiplicities and acknowledged as such (Bingham & Hinchliffe, 2008).

Health Organization (WHO) when speaking in the context of the H1N1 pandemic, is 'the worldwide spread of a new disease' (World Health Organization, 2010). This concept encompasses communicable diseases that have the capability of spreading into multiple countries. However, the WHO definition is not free from controversy and has been cast into doubt, most notably in the wake of the H1N1 pandemic (Doshi, 2011; Kelly, 2011). The controversy stems from the power of so few words to build undefined realities. Indeed, the shorter a sentence, the more flexible its application. In defining pandemics, the WHO's definition leaves the extent of 'worldwide spread' and the nature of the novelty in 'new disease' undefined. Hence, while the core idea is clear, the conditions for a pandemic remain flexible. As the H1N1 controversy showed, 'worldwide spread' could involve two countries or dozens of them, and, likewise, 'new disease' could refer equally to a completely unidentified virus and the re-emergence of an old one. The concept of pandemic and its definition are important because they are the thread that stitches together the various discourses and practices I consider throughout this thesis: without pandemic potential, an epidemic cannot be a global health concern that drives worldwide implementation of international health policy.

The study of pandemic responses from a social scientific perspective has often been framed in terms of biosecurity (see, for example, Collier & Lakoff, 2008a; Collier, Lakoff, & Rabinow, 2004; Dobson, Barker, & Taylor, 2013). The field of biosecurity deals with 'the various technical and political interventions — efforts to "secure health" — that have been formulated in response to **new or newly perceived** pathogenic threats' (Collier & Lakoff, 2008b: 8, emphasis added). Institutions usually respond to biosecurity concerns by means of biopreparedness strategies and policies. While Chapter 2 deals with preparedness specifically and how prior literature has handled the concept, I find it prudent to define it in its most basic sense before continuing. Pandemic preparedness (or biopreparedness) is a collection of techniques, capacities, and practices that are aimed at preparing for an upcoming pandemic. At its most abstract, it is formulated as a capacity to deal with **any** pandemic threat. In more practical applications, preparedness guidelines or regulations can be more specific and address specific diseases – e.g., influenza, coronaviruses, or haemorrhagic fevers – while remaining open enough to deal with other instances of the disease in question.

From a more institutional perspective, 'biosecurity' is used as an umbrella term for the control of threats originating with emerging infectious diseases. This has a strong link to three distinct types of threats: natural outbreaks, laboratory accidents, and bioterrorism. Natural outbreaks generally result from mutations in the genetic make-up of viruses already existing in the

so-called animal realm[2] that render the viruses able to infect human populations and spread amongst them. The category of laboratory accidents encompasses primarily the accidental release of dangerous viruses that are being experimented upon, including genetically modified viruses. Finally, 'bioterrorism' refers to releasing a biological agent[3] with the intent of spreading it among the population and thereby creating terror. This category is bound up with conceptualisations of terrorism in the domain of the so-called war on terror and is very much integral to the securitised understanding of health that I mentioned above.

This three-pronged view of sources of threat has served as the starting point for much of the policy-making directed at tackling pandemic threats. Such policies often present pandemic, laboratory and bioterrorist threats as **functionally equivalent in terms of response and as largely unspecified threats** that eventually will be actualised and hence bring catastrophic consequences for society. This is what Carlo Caduff (2015) has called the prophetic pandemic narrative. Here, there is no doubt that a biological emergency will take place; the questions, rather, are of what will happen, when, and how. As Brian Massumi (1993: 11) has phrased it, the 'pertinent enemy question is not who, where, when, or even what' but a 'what*not*'.

It is clear from the various conceptualisations that there is no single, all-encompassing understanding of biosecurity; instead, the concept is largely contingent on context. The divergent uses of the concept of biosecurity characterise what Nick Bingham and Steve Hinchliffe (2008) have called 'the multiplicities of biosecurity'. These multiplicities encompass more than the conceptualisations presented above. The authors go further. First and foremost, according to them, there is geographical diversity: biosecurity is conceptualised in line with the region involved. For instance, biosecurity work in Europe places a strong focus on agriculture and disease outbreaks, while the Australasia region is especially concerned with the protection of local ecosystems from alien/invasive animal and plant species. United States (US) biosecurity policy, in turn, emphasises national security and health threats to human populations. Of course, these definitions and concerns are not exclusive to the region cited, and some approaches have expanded considerably, with not all being equal in this regard. For instance, as I argue

[2] Human and animal epidemiology tend to separate human epidemics from animal epizootics. However, the boundary between animal and human diseases is regularly challenged by declared international emergencies, as was the case with H1N1 (Tirado & Cañada, 2011). I expand on my understanding of human and nonhuman relations in Chapter 3.

[3] A simplified definition of biological agents would describe them as molecular forms of life with potential of being used as biological weapons. In the context of pandemic threats, they are viruses that either have been weaponised or have potential for being so. A large part of Chapter 7 is dedicated to analysing how threatening molecular forms of life are depicted in pandemic narratives, whether they represent bioterrorist or natural threats.

later, the US plays a prominent role in setting the global health agenda and, in consequence, the focus on national security and population health in particular has expanded far beyond US borders.

If we look at biosecurity in the frame of laboratory research, yet another understanding emerges: it appears very often as a series of recommended and protocolized practices followed in laboratories and that emerge as a complement to biosafety. While biosafety comprises protocols and practices by which laboratory workers can safely manipulate biological agents during the research process, biosecurity is centred on protection of the pathogenic samples and the sensitive knowledge that researching them produces. Therefore, it is focused on research activities with potential for bioterrorist application.

From the foregoing, it is abundantly evident that the concept of biosecurity remains hard to pin down. Therefore, I felt that reformulation of the topic in more concrete terms would benefit my research – while I do engage with previous scholarly work in the area of biosecurity, **I redefine my object of research and choose to focus on pandemic threats instead of biosecurity**. This helps to clarify my area of interest while not obscuring the multiplicity or the locality elements characteristic of biosecurity. It also generally limits my use of the concept of biosecurity to the context of secure laboratory practices. In this connection, I understand pandemic threats as complex processes that can lead to declaration of a public-health emergency of international concern (PHEIC), referring to an infectious disease that has potential to affect the whole globe. Even though infectious diseases are generally understood in relation to a specific virus, I will be addressing them as a more complex sociotechnical process (Tirado & Cañada, 2011). This lens highlights that pandemics involve populations, which are bounded by borders and nationhood; that, in a sense that will be detailed below, pandemics feed on the scientific knowledge that gives them an identity; that they rely on social interaction to spread, both materially and in discourse; and that they enact specific ways of understanding the life forms involved – the 'bio' in 'biosecurity', as the living elements that are governed by public-health response processes.

Even if it might seem self-evident when spelt out, it is important to note also that **pandemic threats rely on their capacity to become pandemic emergencies**. In other words, **it is their changing status that makes them an object of interest from a health perspective**. As I will discuss in much greater depth in the next chapter, the reconfiguration of boundaries and categories that occurs in the face of pandemic threats becomes most visible at the interface between the pandemic threat and the pandemic emergency phase. Accordingly, it is crucial to recognise **how threat and emergency articulate each other** and what the main ways of addressing them are. As I stated earlier, emergencies are often connected to specific

viruses that enable the emergency to stabilise its identity. Another basic step is the emergency gaining some sort of institutional recognition. Categorisation schemes such as that involving the above-mentioned PHEIC are key in pandemic threats' transformation into pandemic emergencies.

Besides being linked with a specific virus, pandemic emergencies often are tied to specific spatial locations. For example, H1N1 was detected initially in Mexico, MERS-CoV in the Middle East, Ebola in West Africa, and Zika in South America. Situating these spatially helps to give them a spatially bounded identity. Their 'nationality' – irrespective of international efforts, especially by the WHO, to avoid attendant stigmatisation[4] – tends to get glued to their given name. Pandemic threats, on the other hand, can be more abstract even if tied to a specific disease, in what is known as 'the generic biothreat' (Lakoff, 2008). That said, several levels of abstraction are possible. We can talk about biological threats without specifying the threat: natural outbreaks, accidental releases, and bioterrorist attacks are examples of biological threats that from a policy perspective are not connected to particular diseases. At the same time, policy-based plans and preparedness work can be developed for particular diseases, such as influenza, haemorrhagic fevers, coronaviruses, or vector-borne diseases. At a yet more specific level, these viruses and diseases are then identified through research processes as subtypes that possess their own characteristics, such as a specific genetic make-up and certain infectivity or mortality features. These different abstraction levels are far from isolated, and generic and disease-specific preparedness efforts tend to coexist.

1.2 THE GOVERNMENTAL CONTEXT OF PANDEMIC PREPAREDNESS

I will now present some of the institutional bodies and tools that have a vital role in defining those threats – whether with a higher or lower degree of uncertainty – and for laying out the building blocks for pandemic preparedness. Among the actors and networks that play the most fundamental parts in enabling organised preparedness, they do so by drafting guidelines, agreements, and regulations. Understanding this context is fundamental to understanding the points that emerged from my analysis.

Securitisation processes in global health, to which I have already referred, can be understood as a consequence of the increase in global connections, which has likewise recasted matters of public and national health, more traditionally associated with the level of cities and national territories, as an issue that extends across national borders; i.e., health is now an issue of

[4] Countries commonly express worry about the effects that the declaration of a health emergency can have on travel and trade. Although the WHO, so as not to discourage case notifications, generally insists that travel and trade with affected countries should not be interrupted, fear of reporting new confirmed cases to the WHO remains a clear problem in countries that depend heavily on these industries.

national security. Once the increase in trade and travel begins carrying health processes more and more often over international borders, biological threats start getting woven into international networks. Thereby, cross-border health threats stretch national health systems to their limits and pose a challenge to their capability for co-ordination. Accordingly, international organisms, agreements, and regulations are becoming central in dealing with those threats. They do not directly resolve the challenges; rather, they offer a platform or arena for working on them. In this section, I discuss the main actors taking a role in that arena. Some of them are international organisms, such as the WHO or the European Union (EU), while others are involved in international agreements or negotiation spaces such as the Biological Weapons Convention (BWC) and still others are nation-states that play roles, however large or small, in shaping global health initiatives. Through their participation in the various arenas and via the partnerships they form, these national governments are key players also in **leading** international initiatives.

This is perhaps a good point at which to note that countries are far from uniform in their participation in international organisations and initiatives or in their weight. This is worth bearing in mind as I return throughout the thesis to the many layers of global health inequalities. Global health inequalities manifest themselves not only in health systems, medical resources, and medical coverage but also in representation and capacity to influence international decision-making, with certain countries playing a much larger role than others in the establishment, development, and direction of global health security (see, for example, Anderson, 2014; Benatar, 2016; Berghs, 2016; Biehl, 2016; H. Brown, 2015; Pallister-Wilkins, 2016). The international health tools discussed in the thesis bring with them a new way of understanding sovereignty, which must accede to the priorities established in the name of global health security (Lakoff, 2015a). With this section of the introduction, I will discuss how that agenda is articulated, in order to delineate the geopolitical context dealt with in the rest of the thesis.

1.2.1 THE WORLD HEALTH ORGANIZATION AND THE INTERNATIONAL HEALTH REGULATIONS

The World Health Organization is probably the most visible health organisation in the world and for good reason. It has the status of a specialised agency of the United Nations (UN). Accordingly, all UN members have the opportunity to become member states of the WHO by ratifying the treaty of its constitution, after which membership is subject to approval by the World Health Assembly (the main decision-making body of the WHO) by simple majority. As of 2017, the WHO had 194 member states (MS), with most countries that are not members of the WHO being post-colonial territories or

countries whose sovereignty is not fully recognised internationally (Liechtenstein is the only nation that is a UN member and not part of the WHO). Finally, some countries, such as the Holy See, Palestine, and Taiwan (as Chinese Taipei), attend meetings as observers.

As has been mentioned above, the WHO has the authority to declare international emergencies. These declarations are not purely of a legal or technical character; they have a demonstrated performative effect. Once the competent authority has declared an emergency, there is a series of public-health responses that are activated, ranging in scale from WHO level to national and local response level. The role of the WHO in these is not limited to co-ordinating the responses. It entails also regulating preparedness for public-health events that have yet to occur. In both 'phases' (preparedness and response), the WHO offers guidance and support to countries that struggle to implement international regulations. In addition, the body promotes many international agreements on surveillance of emerging diseases and encourages sharing of biological samples for scientific research.

However, depicting the WHO as an incontestable authority would fall short of painting the full picture. It is important to point out that, whatever authority it is now accorded, that authority did not simply wink into existence, carved in stone. Of the process, Erin R. Graham (2013) has argued that only since about 1998 has the WHO started to overcome the deep fragmentation that initially affected its authority. Also, with the exception of the WHO's generally praised management of the SARS crisis in 2003, every PHEIC has put the entity on the spot and prompted questions about its ability to handle global health emergencies. Much of that fragmentation is associated with the current functioning of WHO membership, in which those interacting with the WHO are not states but their ministries of health, which are seen as quite weak in state government hierarchies (Robbins & Freeman, 2015).

One of the main tools developed to overcome those challenges is the International Health Regulations (IHR) (World Health Organization, 2005), probably the most important international tool for regulating, co-ordinating, and organising public-health responses to international health emergencies such as those stemming from pandemic threats. The IHR are an internationally binding agreement under which signatory states come together in developing a series of core capacities to deal with health events. Even if their scope is quite broad, public-health emergencies and, more specifically, communicable diseases are among their main foci, if not the central focus.

The IHR are now in their second iteration. The current version, published in 2005, marks a huge departure from the original (1969) form, thanks largely to content heavily influenced by the anthrax attacks in 2001 and the SARS response in 2003. In contrast, the 1969 edition of the IHR was focused on six specific diseases – smallpox, typhus, relapsing fever, cholera, malaria, and yellow fever (Kelle, 2007). The list approach has been left behind in favour of several novel elements, of which three are especially worthy of highlighting. The first is an **all-hazards approach**, whereby policies take on a non-

specific scope that covers both existing and not-yet-identified communicable diseases, hence the abandonment of a disease list. Second is lack of rigidity in that there are **no predefined sets of measures**; the necessary public-health response is kept unspecified and therefore more readily adapted to threats that may emerge. Thirdly, there is an objective of **tackling threats at their source**: strong surveillance at all levels has been made into a fundamental step for arrangement of a global health response.

The main purpose of the new IHR was to establish, with these features, a common international framework to deal with public-health emergencies irrespective of the disease, its origin, or the public-health needs created by it. This seems sensible enough; however, their implementation brought many more challenges than expected. While they entered into force on 15 June 2007 and the initial deadline for implementation of the IHR by all signatory parties was 2012, the latest report available at the time of writing, from January 2015, still cited only a third of the countries signing the agreement as having reported implementing them fully (World Health Organization, 2015). It is important to note that even this implementation is purely self-reported – there has been no verification of it. In fact, several WHO personnel interviewed for my research commented that many capacities that countries had reported as implemented in the context of the WHO implementation assessment were revealed to be absent when the Ebola emergency arose. Accordingly, countries then were allowed to apply for a second extension, for which the implementation deadline was 15th June 2016. Even though there are no reports discussing a third implementation round, it seems plausible that not all the signatory countries were able to develop all the required core capacities by the new deadline.

While these troubling issues remain, the role of the WHO in governing emergencies cannot be overstated. This body is the central authority on issues of global health, and its documents, decisions, and public statements of any sort have a strong influence in the governmental, public, and media domains. A case in point is the figure of the PHEIC, which has become a sort of trigger marking the start of a public-health response both at international and at national level – even though the WHO's authority often does not actually extend to the specifics of national responses. Designation of a public-health event as a PHEIC has the power to move resources, motivate research, and trigger crisis-response mechanisms. Hence, throughout the thesis, the WHO is a highly productive lens for understanding international health processes, nodal points between stakeholders, and what is at stake in the fight surrounding pandemic threats and emergencies.

1.2.2 THE EUROPEAN UNION AS A MEDIATOR TO NATIONAL SOVEREIGNTIES

The EU's public-health role is fairly similar to that of the WHO: it assists in co-ordinating, regulating, and implementing public-health responses throughout the European community. However, there are key divergences from the WHO with regard to status and authority among the MS.

Firstly, its geographical scope is, of course, much more limited. Even though the EU regularly participates in humanitarian actions in non-EU countries facing health emergencies, its regulatory power does not stretch beyond its borders, which at the moment contain 28 states within European territory (soon to be 27, once Brexit is over). Secondly, the member states retain all national competencies related to health. Though it does not actually differ from the WHO in this regard, the EU has a much lower level of authority over health matters than many other concerns. While the IHR is a binding instrument that encompasses also country-internal core capacities, European decisions in this field generally carry force only with regard to cross-border issues, as in the case of the Decision on Serious Cross-border Health Threats of the European Commission (EC), Decision 1082/2013/EU. Thirdly, the role of the European Union is further moderated by the entity's broader scope. Much of the regulation dealing with biological and pandemic threats crosses administrative boundaries, extending beyond the purview of the Department of Health and Food Safety and entering the domain of the Department of Migration and Home Affairs or the Department of European Civil Protection and Humanitarian Aid Operations.

Irrespective of such complications, the EU plays a quite considerable role in steering national health legislation on handling biological emergencies both before and after an international emergency has been declared. This role is especially prominent with regard to drawing together various international actors. For example, the European Centre for Disease Prevention and Control (ECDC) has a history of organising simulation exercises of various types for public-health response training. These exercises, as I will argue during the analysis, are among the main ways of bringing together relevant international actors in the face of biological emergencies.

Where the EU plays its greatest role, however, is in co-ordinating initiatives and creating governmental tools to regulate interaction between member states, in line with the remit for co-ordinating cross-border matters. Central to preparedness, the above-mentioned Decision 1082/2013/EU updates and broadens the earlier tool offered by Decision 2119, from 1998, and incorporates the new ways of understanding public-health threats that have emerged in the last decade. While implementation of European health regulations remains the responsibility of MS, European regulations that very much reflect global inputs (such as changes and dynamics introduced earlier by the IHR) play a key role in the development of national health systems.

1.2.3 THE BIOLOGICAL WEAPONS CONVENTION AND THE FIGHT AGAINST TERRORISM

The BWC – brought into being under the auspices of the UN – was the first international agreement banning an entire category of weapons. It was opened to states parties in 1972 and came into force in 1975, with the main objective being to ensure that states do not develop, use, or even indirectly facilitate the production of biological weapons. Since its creation, the convention has steadily been developing in its objectives and attracting actors in larger numbers, with the aim being wider implementation and extension of the convention. Eligible states include all 193 members of the UN plus the Cook Islands, the Holy See, and Niue. Since its inception, the number of states parties has grown from 109 to, as of December 2017, 179. Of the remaining states that fulfil the eligibility criteria for membership (one of which, Taiwan, is not fully recognised by some member states for reason of sovereignty disputes), six have signed but not ratified the treaty in their national parliaments and 11 have neither signed nor ratified the convention. States parties aim at collaborating in order to implement and enforce the convention, with one key form of collaboration being the creation of new tools and strategies to this end.

For example, the Implementation Support Unit (ISU) aims at ensuring that the BWC is followed by all parties to it. In light of the absence of officially public bioweapons programmes in any of the signatory countries, the value of the BWC has shifted in new directions. On one hand, many dedicated efforts to promote transparency among the members are represented by tools such as the confidence-building measures (CBMs). These promote the exchange and publication of national data, including information on biological research activities and vaccine production facilities. At the same time, the ISU encourages the discussion and promotion of good scientific practices. This is a consequence of the fine line between defensive and offensive research, in what is usually known as dual-use research of concern (DURC).

The states parties have been meeting, by and large, regularly (about every five years) since the creation of the convention. However, 2001 saw an intensification of activity, coinciding with the aftermath of the 'Amerithrax attacks', the name given to the shipping of envelopes containing anthrax spores by mail in the US, which killed five people and infected 17 more. Since 2001, besides the quinquennial review meeting, intersessional states party meetings have taken place once a year. It is worth noting also that in the last few years, the role of non-state actors in the meetings has been growing. Institutions such as universities and non-governmental organisations (NGOs) have gone from being allowed to attend with observer status to being permitted to give speeches after all countries have had their own say.

The BWC's role in global health is not so much related to medical responses or intervention but it does play a very important role in defining what counts as a biological threat and what does not from a biowarfare and bioterror perspective. In defining biological threats, they also connect health and military logics. The activities around the BWC therefore are central to the securitization processes I mentioned earlier in this chapter. Also, the BWC plays a very important role in characterising research. Since the spectre of biosecurity concerns renders the study of viruses always a threatening activity, biomedical research with the objective of treatment can easily turn into a security matter. Along the same lines, the BWC contributes to establish the line between 'acceptable' and 'non-acceptable' research via the categories of defensive and offensive biological weapons research. Finally, relevance of the BWC for public health can be found in the convention's ability to bring together disparate international actors to oversee issues related to the threat posed by biological weapons.

1.2.4 THE INEQUALITIES OF GLOBAL HEALTH

I have now described three of what I consider the most important international actor spaces and arenas in the context of global biopreparedness. At this stage, my explanation remains somehow simplified, for the sake of clarity and presentation of a compact frame that aids in understanding the context in which I situate the thesis. It is vital to my arguments that the various MS (and, in the case of the BWC, non-state actors) are far from homogeneous in their participation. Some of them have a much more important role than others and have been more able to influence the global health agenda. For example, countries such as the US and the United Kingdom (UK) have a leading role in shaping of global health dynamics (H. Brown, 2015; Crane, 2010) – in parallel with patterns of geopolitics in general. Also, Europe and the so-called global North generally occupy a privileged position. Indeed, networks of expertise centred in the global North have sufficient resources and authority to point out what problems are deemed relevant and the possible solutions in the field of global health, thereby setting the agenda for the rest of the world (Crane, 2010). Furthermore, the collaboration wrought for pursuit of the objectives on the global health agenda is generally framed by countries of the global North as in 'partnership' with the global South, in an attempt to display balance in place of these inequalities. However, these 'partnerships' are often subject to strong power dynamics and imbalances in terms of funding and other resources (H. Brown, 2015). It is no coincidence that the increase in funding related to bioterrorism and biosecurity took place right after the Amerithrax attacks of 2001 – the changes at US level had a profound effect on the configuration of international initiatives such as the IHR and establishment of the Global Health Security Agenda (GHSA), while other countries were not only subjected to discrete roles imposed thereby but also forced to implement and develop certain core capacities that are not necessarily in line with their

own health priorities, as one of my informants told me when reflecting on the implementation of the IHR in North Africa and the Middle East.

As several authors have pointed out, in various connections, locally prepared implementation plans responding to global agendas often disregard locale-specific factors (Samimian-Darash, Henner-Shapira, & Daviko, 2016; Wanderer, 2017), with these dynamics often being rooted in post-colonialist relations between countries (Anderson, 2014; Berghs, 2016; Pallister-Wilkins, 2016). It is important to remember that localities differ greatly in their standing in the field that has come to be known as global health (Biehl, 2016). As has been noted by historian of science Warwick Anderson (2014), a danger lurks in understanding global processes in isolation from localities and from the multiple scales that articulate the picture on the ground. However, looking too deeply at issues of colonialism and globalisation in efforts not to obscure the politics of globalisation is to get a bit ahead of ourselves. I will return to this topic at several points as the story unfolds, but for now this section here should suffice as a reminder that international dynamics around cross-border health are mediated and regulated by existing inequalities among countries and regions.

1.3 THE RESEARCH QUESTIONS AND THE WORK'S FOCUS, SCOPE, AND STRUCTURE

Towards the beginning of the chapter, I laid out the general argument made in the thesis: that notions of threat and protection are always intimately tied in with the international fight against pandemic threats and emergencies. The threat/protection dichotomy refers to how these categories are defined and how social actors enacting each of them are identified. Having expanded on the background for this argument, I believe I have made it reasonably clear that this divide, from an institutional perspective, is not a simple matter. Rather, it is a result of sociotechnical processes that take place in a multiplicity of contexts.

Those contexts are illustrated well by some of the elements I have already presented that feature prominently in the fight against pandemic threats: the interaction between the lay and the expert, the connection between threat and emergency, and the dynamics of the project of pandemic preparedness and response at both global and national level. This interweaving of threads points to a need for better understanding of institutional and expert perspectives on pandemic processes, including of how they are constructed and become productive. Hence, the main goal of the thesis project was to study **the construction of knowledge and implementation of pandemic preparedness and response at the crossroads between global and**

local social processes. To pursue this main goal, I developed three research questions:

1. How do the threat/preparedness and emergency/response phases of pandemic processes interact?
2. How are the productive classification schemes, boundaries, and dichotomies that guide pandemic governance negotiated and configured?
3. How do those boundaries deployed in pandemic governance lead to a certain understanding of biological threats and to productive ways of governing them?

These three questions circumscribe the initial concerns that motivated this research. However, the way I have chosen to organise the thesis is better understood in light of the main argument as already presented and the three areas of focus that guide the analytical chapters' discussion. Here, in the last section of the introduction, I will expand on the overall argument and those three distinct foci. Then, I will discuss the position the thesis occupies with regard to its scope and reach in terms of the global and the local, academia, and institutions. Finally, I will describe, chapter by chapter, the structure of the work.

1.3.1 THE MAIN ARGUMENT AND AREAS OF FOCUS

I have characterised the thesis's core idea as being that **in the international fight against pandemic threats and emergencies, there are always notions of threat and protection at play**, with which the actors involved are characterised concretely as threatening, vulnerable (i.e., in need of protection, or expert (i.e., able to do the protecting). This occurs through boundary-making, categorisation, and identification processes by means of outputs from governance and knowledge-making. Furthermore, the way in which the various social actors are categorised and identified in pandemic processes not only helps to construct specific biological threats but also plays a central role in the governance and agency of those actors, both human and nonhuman.

The three specific categories I focus on in the thesis – threat, vulnerability, and expertise – emerged as especially relevant in the institutional and technoscientific pandemic settings studied[5]: the challenge for health and research institutions is to identify certain actors or objects as threatening, vulnerable, or expert so that they can be governed accordingly. Amidst efforts at identifying those actors, boundaries are challenged by the more-than-

[5] These are, therefore, empirically driven categories (see Chapter 4). Though they feature prominently on centre stage already in this introduction, they are output of retrospective analytical considerations. Although they emerged at the time of the analysis, I find it important for them to feature earlier on in the text because they are key in developing my main argument about threat and protection.

human nature of the three categories and by the way certain categories and identities are defined intersectionally. As the core argument unfolds, I follow **three specific areas of focus** wherein these categories take shape: the establishment of governmental networks, knowledge-making and knowledge-distribution practices, and the conceptualisation and identification of threatening forms of life. These three areas were key in the preparation of the thesis: they guided the analysis of empirical material (presented in chapters 5, 6, and 7), and the conclusions have been shaped in line with how the three areas of focus interface with each other (see Chapter 8).

The first of the three areas is articulated around how pandemic preparedness is made governmentally productive by bringing together various governmental organisations and other stakeholders. The discussion thus is directed at understanding how institutional boundaries are challenged in a globalised context in the face of locally occurring biological threats that are of international concern. This topic is addressed largely in Chapter 5, with attention to diverse tools and mechanisms for dealing with pandemic threats and emergencies. These tools and mechanisms are constructed by government institutions and are put into service for tackling virtual threats – i.e., threats that have been defined as plausible facts of the future, as I explain in Chapter 2. These governmental networks are the context in which the need for identification and categorisation emerges.

With the second area of focus, I look at how knowledge-making informs pandemic preparedness practices and helps to draw the boundaries of expertise by establishing vulnerable and expert collectives. In other words, by regulating access to knowledge and other resources, expert communities produce boundaries that separate the expert from the lay and from the threatening. The knowledge produced is therefore of use for informing the governmental apparatus and describing the relevant actors involved in pandemic threats on the basis of threat, vulnerability, and expertise. This is addressed mostly in Chapter 6, with discussion of various practices of knowledge production and distribution and examination of the consequences of those practices in formation of differentiated communities.

The third area is that of how individual life forms (both human and nonhuman) are identified and conceptualised as threatening. Something is defined as of a threatening nature in line with the social entanglements that it participates in. That is, they are enacted and governed as hybrid biological threats. This topic is addressed in Chapter 7 with consideration of how various life forms are depicted by institutional and technoscientific sources and in discussion of how those life forms are governed with regard to pandemic threats and emergencies. In such governance, actors are understood not merely with reference to some seemingly intrinsic definition of threat, vulnerability, or expertise. Rather, these three categories

are defined in terms of engagement with notions of space, technology, nationality, and gender.

These three areas of focus overlap to a large extent. Throughout the analysis (chiefly in chapters 5, 6, and 7), it is quite evident that they constantly leak into one another. Why, then, do I separate between these areas at all? The decision attempts at constructing an efficient narrative that renders the boundary-making, categorisation, and identification processes intelligible in my analysis. I draw attention to the connections between these three focal areas, the categories that emerged during my analysis, and my conclusions, which all are important parts of the thesis project's outputs. Governance, knowledge, and conceptualisations of threat are not isolated realms of practice; together, they form what is at the core of pandemic threats as defined in this thesis.

1.3.2 SCOPE AND REACH

In this subsection, I describe the scope and reach of the thesis from both a theoretical and an applied policy perspective. By explicitly identifying the contexts in which the work is embedded, I enable the thesis to be viewed in the appropriate light. Also, I expand on the relevance of some of those contexts by making explicit my audiences, which are situated both within academic domains and in policy spaces. While some audiences might have greater interest in some parts of the thesis than others, the conclusions are presented in a manner that should be of clear relevance to all. I will summarise my points with the objective of making them useful for the audience at large.

I will begin with the matter of **the global and the local**. Regarding globality and representability of specific localities, I would like to stress that I make no attempt to represent the full spectrum of global possibilities for the configuration of pandemic emergencies. As I further clarify in the methodology chapter, visiting multiple sites for observation is considered a valuable technique for capturing variability when looking at spaces where globality itself is made (Blok, 2010; Law, 2004b; Tsing, 2005). Indeed, as Kim Fortun (2009) has argued, the global is often forged from the interaction of different levels and through scaling and harmonisation processes. From her perspective, aspirations to be globally comprehensive are naïve and lack critical purchase. Certainly, it would be disingenuous to claim that anyone can give a true picture of the global health scene – not only because of its size but since all depictions of global health and the pandemic-related enterprise are necessarily partial. Rather, the arguments presented in the previous section are in keeping with the idea of occupying several sites where pandemic threats and emergencies are dealt with while looking at emerging patterns that might appear across them. With this approach, I attempt to escape from totalising narratives of pandemic preparedness and from any focus on prominent – and, again, often also totalising – national cases, such as that often found bundled with the US (Samimian-Darash et al., 2016).

Secondly, I should address **the academic or theoretical perspective**. This thesis places a strong focus on discourse understood as a set of meanings, practices, and materialities. In my attempt to describe those patterns that configure governance, knowledge, and threat conceptualisation in pandemic preparedness, I look at how certain discourses and their materialities come together in textual material (with sources such as policies, articles, regulations, and experts' accounts); however, I steer clear of identifying any grand or unitary discourses, for I believe the reality in most cases to involve multiple discourses, in the sense meant by Annemarie Mol (2002)[6]. My interest lies in the capacity of different discourses to identify, classify, categorise, and produce difference (Bowker & Star, 2000). In looking at how those discourses develop, how they are positioned, one finds that there is constant production of boundaries, categories, and identities in the spaces of public and global health. In the context of this thesis, I decided to explore those surrounding categories of threat, vulnerability, and expertise because of their salience in the empirical material analysed (see Chapter 4)[7]. These categories grew out of the discourses and practices I examined.

This thesis diverges from comfortable traditions also in the disciplinary spaces it occupies. It draws on a multiplicity of sources, which are situated in a wide spectrum extending across disciplinary boundaries. However, the individual sources themselves are already transdisciplinary[8]. On my trans-disciplinary adventure, I have relied mainly on the theoretical tools provided

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[6] In the book *The Body Multiple*, Mol (2002) addresses the way atherosclerosis is constructed in the context of a Dutch hospital. Her empirical work encompassed various practices carried out by several types of actors involved in day-to-day hospital life surrounding the disease: physicians, nurses, and patients render the disease concrete and visible in different ways. Her theoretical claim is of special interest here: those various practices and ways of conceptualising the disease are not expressions of separate perspectives on the same object. Rather, Mol suggests, they are all key ways of defining one object with a specific identity in terms of multiplicity.

[7] Other interesting boundaries and categories too deserve consideration. They emerged during my review of relevant literature. Two examples are those between the virtual, the actual, and the possible (Samimian-Darash, 2011; 2013) and those between orthodox and heretical knowledge (MacPhail, 2014).

[8] I use the word 'transdisciplinary' as an 'almost-taken-for-granted' black box that I do not dare to open. Describing my work as transdisciplinary should indicate that it does not sit within the boundaries or wholly outside borders but, rather, extends across disciplines' boundaries. In using transdisciplinarity as a tool for my own positioning, I try to do two things. Firstly, I eschew the overly hyped buzzword 'interdisciplinarity' and the slightly-too-conservative notion of multidisciplinarity. Secondly, I refrain from entering the territories of the post- and a-disciplinary and of thereby opening a box (both black and Pandora's) that might emit too much noise. Special mention is deserved by Mike Michael's creations 'contradisciplinary' and 'hypodisciplinarity or infradisciplinarity', which offer new options for thinking

by science and technology studies (STS), Foucauldian approaches, and more-than-human understandings of social sciences. Accordingly, my thesis should speak to a wide audience of social scientists with an interest in issues at the crossroads of science, technology, politics, and knowledge-making.

Just as this thesis does not sit comfortably within the neat lines of disciplinary spaces, it does not adhere to strict categories such as the methodological, the empirical, or the theoretical. It is common for scholars to be faced with the question of whether their manuscripts tick the box for 'empirical', 'methodological' or 'theoretical. While some work could be thought of as a synthesising review or commentary, a sense prevails that articles still should present one idea; be of a single genre; and, in consequence, employ only one type of language. **With this thesis, I do not follow such an ideal**. As I try to distance myself from in-depth elaboration on theory and equally attempt to avoid purely reporting empirical material for its own sake, I navigate genres, and with them I navigate languages. **I therefore actively take a promiscuous position, engaging with various aspects of academic writing.** In my attempt to draw together theoretical, empirical and methodology-linked considerations, my writing style often seems to cross paths with specific genres. Although I have arranged my chapters in accordance with traditional notions of the literature review, theoretical framework, methods and methodology, and analysis, the corresponding chapters do not remain pure examples of those categories. Rather, I visit most of these topics in other chapters too, so as to show that these elements are not merely connected to each other but, in fact, co-construct each other. The chapters engage naturally with multiple academic genres because the points I attempt to make are relevant with regard to **all**.

Finally, my work has a particular institutional component: from **the policy perspective**, the objective for this thesis has not been to support or criticise specific preparedness policies, perspectives, or practices. While I engage with many policy, scientific, and technical discussions, my aim is to understand what sorts of categorisations preparedness calls into being and bring awareness to what is at stake in those categorisations. Calling attention to social governance and knowledge-making in pandemic preparedness should aid in understanding the internal workings of pandemic preparedness and response more fully, along with how these might affect the variety of social actors falling under pandemic governance. This is an attempt at opening up the policy field by casting light on those actors and processes that are secondary or marginalised yet play an important role in how pandemics develop. I hope it makes a definitive contribution to policy-makers and public-health professionals knowing what is at stake when pandemic preparedness is made.

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of social research as something that goes beyond disciplines (Michael, 2000). For wide-ranging discussion of various forms of understanding of these terms, see the special issue of *Theory, Culture & Society* titled 'Transdisciplinary Problematics' (2015).

1.3.3 THE STRUCTURE OF THE THESIS

The thesis has eight chapters, with background presented by this introduction; Chapter 2, with its focus on social scientific work that has addressed the conceptualisation of pandemics and other biological threats; and a review, in Chapter 3, of some central concepts and theoretical ideas applied to make sense of my empirical material. The fourth chapter describes how I collected and analysed the empirical material. Then, chapters 5, 6, and 7 work together as the analytical core of the thesis. They all are organised in the same fundamental manner: I introduce a 'small' theoretical concept or idea that helps me frame and understand my empirical material, and I continue by illustrating how threat, vulnerability, and expertise are made in pandemic preparedness and response. Finally, Chapter 8 offers some concluding thoughts that extend across the three empirical and analytical chapters. For fuller orientation, I will now describe the content of each of the coming chapters.

Chapter 2, 'The Turn to Preparedness', serves as a literature review and presents the main social scientific discussions that have taken place over the last 20 years with regard to pandemic preparedness, biosecurity, and the fight against infectious diseases and biological threats. It begins with an introduction to classic conceptualisations of risk and fear, such as those of Ulrich Beck (1992), Anthony Giddens (1999a; 1999b), Massumi (1993; 2005a), and Frank Furedi (1997; 2008). While my engagement with these perspectives in the analytical discussions is rather limited, it is important to briefly review them, since they have greatly influenced later theorisation on pandemic preparedness, which takes the leading role in the second part of Chapter 2. Such theorisation comes with thoroughly documented governance and knowledge-making practices in the context of biological threats and security, and it represents a change in the logics of anticipation whereby new techniques and practices are incorporated into the ways in which security threats are formulated and defined. This change in the globalisation of health emergencies is the starting point of my analysis. I take the discussion further by then addressing how the work of Limor Samimian-Darash (2011; 2013) has defined anticipated pandemic threats as virtual. In her work, pandemic threats are virtually designed as a result of uncertainty. Preparedness practices help to construct upcoming threats that, while not yet having been actualised, affect our present reality. I conclude the chapter by suggesting that all the techniques and practices of anticipation discussed have one thing in common: they are attempts to compass the identity, position, and temporal dimensions of uncertain biological threats.

Chapter 3, 'More-Than-Human Boundaries, Categories, and Identities', introduces several key theoretical underpinnings that cut across the background of all the empirical and analytical chapters. In this chapter, I argue

that dynamics of pandemic preparedness are often defined in terms of identification, categorisation, and boundary-making. In other words, the pandemic narratives that emerged in the empirical material tend to identify relevant actors as threatening, vulnerable, or expert. In this context, there is a society that is vulnerable and needs to be protected (formed by both expert and vulnerable actors) and an alien element that represents a threat to that society. Such groups are more-than-human assemblages that involve humans, animals, viruses, technologies, equipment, infrastructure, and other nonhuman entities. I therefore argue for a more-than-human (Whatmore, 2006) understanding of identity. In the second part of the chapter, I engage with theories of boundary-making that might assist us in thinking about how the boundaries between distinct identities and categories are built. Notwithstanding the determination of the preparedness apparatus to identify, define, and govern threat, the categorisation process and the boundaries used for the various assemblages are often blurry. Finally, I undertake to summarise some academic discussions about categorisation around notions of interiority and exteriority and, more concretely, consider what the implications might be for global health. I do this by commenting on Beck's and Bruno Latour's discussion about cosmopolitanism (Beck, 2004; Beck & Camiller, 2005; Latour, 2004), in a review that lays foundations for discussing what it means to be a part of vulnerable and expert assemblages and how the threatening outside is often formulated in terms of knowledge and control.

In Chapter 4, 'An Empirical Assemblage', I address the main methodological features of my study. To describe how the empirical material collected is understood as an empirical assemblage, I proceed from Deborah Youdell and Ian McGimpsey's (2015) concept of 'assemblage ethnography'. Assemblage ethnography is not culture-based as traditional ethnography is but network-based. It is conceived of as a tool to study policy issues that are acted out at multiple sites and at different scales. Next, I introduce the main sites of collection of empirical material, which are distributed across several locations, scales, and fields. I then provide a list of the material used and an explanation of how that material was handled and analysed. I end the chapter by engaging in some ethics-related and methodological reflections.

With Chapter 5, 'A Stand-by Governmental Apparatus', I address how one of the main boundaries that pandemic preparedness deals with is a temporal boundary that conditions the identification of the threat and the appropriate response. This temporal boundary is between preparation before the threat and implementation of the prepared resources and mechanisms during the emergency. This boundary is addressed partly by 'governing governance itself' – in other words, by establishing biogovernmental procedures that will be enacted only once the threat is actualised. The stand-by apparatus is part of those mechanisms. It is formed via various governmental tools that govern and construct the biological threat before, after, and during an emergency. I argue that building of stand-by networks through co-ordination, sharing agreements, and distribution of responsibility sets in place the essential

infrastructure for carrying out stand-by governance. These networks are fruit of processes of 'institutional biosociality' (N. Brown & Michael, 2004), whereby institutional boundaries are challenged when social actors are brought together as new biological phenomena emerge. The challenging of those boundaries helps to reconfigure the boundaries related to pandemic expertise. Three practices from the empirical material serve as examples of how stand-by networks are made productive: stockpiling of medical countermeasures, training of specialist personnel, and construction of plans and protocols. I conclude that stand-by governance and mechanisms are dependent on knowledge – they need knowledge about the threat and an authoritative community that can produce such knowledge.

In Chapter 6, 'Producing Knowledge, Producing Communities', I discuss how knowledge-making practices assist in the stand-by process while, at the same time, constructing 'epistemic communities' (Haas, 1992; Ruggie, 1975) with the ability to contribute to pandemic preparedness knowledge. These communities are shaped through knowledge-making and knowledge-distribution practices, yet they are not stable groups but constantly subject to changing, partial, and blurry memberships. To illustrate how those communities come together, I present some empirical material that exemplifies a series of knowledge-making and knowledge-distribution practices. I round out the chapter by pointing out one of the main ways to identify threatening, vulnerable, and expert actors as such. For epistemic communities to take shape, they need a community of 'others' that lacks the ability to shape and access the knowledge produced. The relationship of those 'others' to the expert epistemic community can take any of several shapes: the group might be a community to protect (such as the public or animal resources) or a threatening community (bioterrorists, humans and animals turned into vectors, etc.).

In Chapter 7, 'Threatening Life and Movable Boundaries', I address how different forms of life are identified and governed as biological threats. Both the stand-by and the knowledge-making apparatus have biological threats as their main object of interest. Life is what needs to be governed, and it is life that we need to know about. In the material analysed, viruses are directly visible only in the lab. Out in the wild, they always appear as animal-virus or human-virus hybrids. This way of understanding threats is not only a way to understand life but also a way to govern it. This corresponds to what Michel Foucault (2008) called a new diagram of life and power. For him, separating the threatening from the vulnerable is a spatial and territorial matter, with quarantine, isolation wards, and segregation as examples. Preparedness brings a twist borne of globalised trade and travel, whereby separating the threatening from the vulnerable must be understood not only territorially but also intersectionally. Genetic make-up, host–virus interactions, wild/domestic divides, nationality, gender, class, education, and culture play

an important role in determining which assemblages are deemed threatening and which are not. In this key chapter, I therefore introduce a diagram of life and power that represents a hybrid conceptualisation of threat, along with examples of how life is governed intersectionally.

In the conclusions, I summarise the key points and make explicit the contributions of the thesis. Firstly, I characterise the institutional pandemic narrative by describing the three main assemblages on which most of the empirical material relies: the threatening, the vulnerable, and the expert assemblage. Secondly, I expand on three theoretical conclusions that draw together the three analytical chapters: a) a more-than-human diagram of life and power, extending beyond human populations; b) a conceptualisation of boundaries as portable, permeable, and flexible; and c) an intersectional understanding of the inequalities that surround boundaries of health. The final part of the chapter is an argument for utilising othered pandemic narratives that incorporate an intersectional perspective of health and threat. After all, pandemic threats are more-than-human assemblages the participants in which are many, very different actors, whose identities and categories are intersectionally constructed as a result of multiple identities and backgrounds. Most institutional perspectives overlook this necessity. I claim that the dominant global health enterprise and all of us who take an interest in the topic have an ethical responsibility to construct threats as multiple objects with multiple possibilities by attending to othered narratives of threat.

2 THE TURN TO PREPAREDNESS

> *I am in my flat, in the Punavuori district of Helsinki. It is dark, as is typical during Finnish autumn. And it is, of course, raining. I sit in front of my computer. I am preparing the first draft of a research plan in hopes of applying to the Doctoral School of Social Sciences at the University of Helsinki. The blank page is also an unwritten future. Pandemics. Biotechnology. Genetics. Focus groups. Interviews. Ethnography. Many topics, methods, and research questions pass before the mind's eye, and I try to decide on some of them.*
>
> *Recollections for a Research Diary, November 2012*

Preparing a research plan sets one in a specific direction. The researcher states on paper (or a digital representation of paper) what is to come, what he or she plans to make happen. All of this is done with a specific outcome in mind: an article, a book, or a thesis and defence of it. At the same time, another side to research plans is familiar to most academics: they are a tool to deal with the limitations of knowledge, a way to address not a known future so much as the not yet known. In other words, the initial plan brings into being a path to a possible future, setting in motion heavy configuration work surrounding the final output. In November 2012, the thesis you are reading was still five years away from 'taking place', from the actual event of completion. This future remained elusive. It existed but only as an upcoming, virtual event. I am not just playing with words here. This distinction is central to what I explore in the finished work: my imagined thesis very much existed at the time and in the strong influence it exerted in pursuit of the ultimate work, already a reality capable of engaging supervisors, peers, referees, and foundations. It was a pre-event linked directly to the event now in your hands (or on your screen). This event was designed to happen and emerged as a product of its past, its present, and its (open and hence multiple) futures. The same process is followed for any anticipated event, intended or not. Pandemics are no exception. Pandemic threats are configured through their relationships with their past, their present, and their future, and hence I argue that their shaping begins through the way they are anticipated, long before actualisation.

The context of global health that I described in the previous chapter has experienced especially large changes over the last two decades. A large part of the change has been related to anticipating threatening events and calculating risk precisely by drawing on their past, present, and futures. The way public-health emergencies are addressed and anticipated from an institutional and a technoscientific perspective has undergone an important shift that can be

traced roughly to the beginning of this century. Authors vary greatly in the events they cite as having played a pivotal role in roughly the year 2000 in redefining how we understand biological threats: the emergence of H5N1 in 1997 (MacPhail, 2014), the 9/11 attacks (Caduff, 2010; Cooper, 2006), the funding trends in the US prioritising attention to bioterrorism and then a focus on biosecurity (Caduff, 2015), the SARS epidemic in 2003 (Lakoff, 2015a; 2015b), and numerous others. None of these authors are necessarily off base; these events are not disconnected from one another[9]. All of them are among the underpinnings to key changes in logics of anticipation, which are at the core of the discussion in this chapter.

The objective for this chapter, then, is to discuss literature related to how pandemic threats, emergencies, and preparedness have been understood and articulated as events to be anticipated. In other words, it serves as a point of departure or a literature review instead of a theoretical frame (I will turn to the task of developing the latter in Chapter 3). Having introduced in this chapter how biosecurity and consequently pandemic threats have been studied from a social scientific perspective, I should be able to articulate my contribution to that body of work.

I divide the chapter into four sections. In the first, I discuss the 'risk society' and 'culture of fear' conceptualisations. For this, I draw on ideas from Beck (Adam, Beck, & Van Loon, 2000; Beck, 1992; 1999; 2002; Beck & Levy, 2013), Giddens (1998; 1999a; 1999b), Furedi (1997; 2007; 2008), and Massumi (1993, 2005a, 2005b), which I believe provide the building blocks necessary for understanding how pandemic threats are framed and anticipated. The risk-society perspective offers a way of understanding risk as a generalised state that permeates and redefines society as a whole. A culture of fear carries such generalisation onward into collective and individual-level affective states that influence both decision-making and everyday experience. Secondly, I address how such a way of understanding risk and fear ties in with a turn to preparedness, representing a shift in the way dangerous events are anticipated. This is what some authors have referred to as a change in the logics of anticipation (Anderson, 2010) or the rationalities of risk (Keck, 2008). While biological threats are a case of special relevance for this thesis, these logics have often been conceptualised as part of wider security schemes wherein biological threats are only one of the things that society may need to prepare for. Hence, a wider view is warranted, and I draw on both health- and non-health-related understandings of preparedness to this end. Thirdly, I argue that the turn to preparedness can be understood as an outgrowth of the

[9] Indeed, how upcoming and present events are thought of and constructed is, to a great extent, a result of their connection with past events that work as models and make available certain imaginaries. Events such as the Amerithrax attacks, the SARS outbreak, and even the outbreak of so-called Spanish flu in 1918 often provide the core premise behind biopreparedness policies: these events offer previous imaginaries of good and bad response, impact, and danger. They are necessary for making sense of current threats and appealing to the danger they carry with them.

blurring of boundaries between threat and emergency. I discuss this confluence by means of the use that Samimian-Darash (2011, 2013) has made of Gilles Deleuze's (2012) ideas, in which both virtual and actual pandemic threats are seen as having an effect on the real. Finally, I conclude by suggesting that in the fight against pandemic threats, risk calculation and incalculable uncertainty inform preparedness and response equally. Furthermore, in this space, the knowledge developed through anticipation practices and the strategies proposed by governance apparatuses are at the crossroads between risk and uncertainty. In the context of this thesis, they are relevant for the common interest expressed in identifying and addressing threats. However, most of the literature discussed in this chapter have overlooked an important underlying process: defining a threat entails defining an object that needs protection. Traditionally, the object of protection has been identified with the population of a given territory, yet current formulations point rather more to the vital systems of a society or state than to populations as being at stake (Collier & Lakoff, 2015). This shift calls for a redefinition of the way threats are identified and categorized as such.

2.1 THE CONTEXT OF (BIO)PREPAREDNESS: RISK SOCIETY AND A CULTURE OF FEAR

I discuss risk society and culture of fear as glosses for developments that have motivated the body of literature in which my work is situated. That is, I use this section of the chapter to frame the pandemic threats that I analyse, rather than to offer theoretical tools for helping to understand them (again, the theoretical tools that help frame my contribution are dealt with in Chapter 3 instead). Because the way various human and nonhuman collectives are identified and categorised in the face of pandemic threats is so embedded in the culture of fear I describe in this section, it and the risk society are a fitting first layer as I build the foundations for this thesis. In other words, I could not have conceived of this thesis without a notion of risk as a ubiquitous element in contemporary society and without an understanding of the collective affective response it generates. As I work upward from that foundation, I will not explicitly refer to risk and fear often throughout the work; however, their influence is undeniable.

2.1.1 (WORLD) RISK SOCIETY

In the previous chapter, I discussed the rather broad WHO definition of pandemics as something that will take place but without known characteristics, origin, and impact. Declaring a PHEIC entails acknowledging the existence of a more concrete threat, yet knowledge of the outbreak's

specific characteristics, origin, and impact is not guaranteed – these features later are clarified as the particular outbreak unfolds. This type of scenario, a future threat that remains undefined (even when it has been identified, experts' ability to know it is limited), is a paradigmatic example of what risk society is concerned with.

The idea of risk society represents a change in the way we relate to the future and, especially, to upcoming threats and dangers. It is rooted in attempts at calculating future events while, simultaneously, the abilities of scientific knowledge to do so remain limited. As Giddens (1999c) has pointed out, reflexive modernity – which is characteristic of risk society – relies on calculating the future and, therefore, calculates risk continuously. More concretely, reflexive modernity marks a break with previous understandings of society and knowledge, bringing an increase in awareness of risk, uncertainty, contingency, and insecurity and, in consequence, an upsurge in attempts at colonising and controlling that future (Ekberg, 2007). In other words, we try to submit future happenings to the rules and knowledge of the present, yet continuous calculation attests to an inability to fully know and control upcoming threats. This constant calculation renders risk a generalised state, a never-ending process that cannot result in full control of the threat.

The consequence is that the society lives in a constant state of risk, and it is in the terms outlined above that any uncertain event that may occur gets evaluated by the relevant authorities. In Beck's words (2002: 40), 'the speeding up of modernization has produced a gulf between the world of quantifiable risk in which we think and act, and the world of non-quantifiable insecurities that we are creating'. Therefore, it is at the interface between quantifiable and non-quantifiable events and knowledge that risk finds its space. Whatever our ability to produce more and more scientific knowledge, more and more data, and entirely new technologies, future events remain beyond the reach of the knowledge produced.

One consequence of this new way of relating to knowledge production is that there is no longer one source of expertise agreed upon as reliable that we can trust to anticipate and control the future. Policy-makers cannot turn to clear-cut sets of findings. Decision-making processes now depend on experts as much as on politicians and citizens (Giddens, 1998). Meanwhile, the experts, aware of the limitations of knowledge, disagree, and science and technology get woven further into a politicised process. This comes together in what Beck (1999: 140) calls a 'peculiar synthesis of knowledge and unawareness': On one hand, while the production of knowledge increases and we constantly know more, there is an increasing space for uncertainty in the new areas opened by knowledge. On the other hand, the opposite is true also. There is an inability to know that which is not calculable. A number of futures might be, but they cannot be known.

These changes, according to Giddens (1999a), result mostly from two shifts. The first of these, which he calls 'the end of nature', took place in the

second half of the 20th century: in simple terms, human society stopped worrying about what nature could do to society and started to focus on what humanity has done to nature (Giddens, 1998). In other words, scientific and technological progress started to affect the way nature behaves and thereby took the leading role in how ostensibly natural events – now permeated by the influence of science and technology – threaten society. The second shift he refers to is 'the end of tradition', whereby fate is no longer inseparable from life: features assigned at birth such as class, race, and gender, according to Giddens (1999a), do not fully determine an individual's fate, and now we live in more active engagement with those categories and the possibilities and limitations that they support. Giddens holds that, with these shifts, a sense of 'external risk' – based on uncontrollable risks associated with nature and tradition – has given way to 'manufactured risk', which consists of risks coming about in the development of humanity and therefore heavily anchored in new technological and scientific developments (Giddens, 1999a; 1999b).

I do not fully subscribe to the latter perspective on a nature/technoscience duality, nor do I agree that today's ideas of risk merely represent inversion of our understanding of the source of risk (from what nature can do to society to what society has done to nature). Although the shifts Giddens detailed are influential, they are only part of the picture. While these two shifts play an important role in defining risks as uncertain, they are not as present in the expert responses offered to face those risks. Most of the institutions that I study in this thesis still operate with modern logics of knowledge, calculation, and control, as I will argue in more detail in Section 2.2. Also, there are many contexts wherein class, race, and gender categories keep playing an important role and where notions of threat are defined in accordance with those categories. Gendered practices, access to education, nationality, and spatiality are some examples I analyse in chapters 5, 6, and 7. The shifts suggested by Giddens are well grounded but, rather than being total, are best understood as coexisting with older, modernist notions of society, knowledge, nature, and control.

Beck (2002) describes the same changes but slightly differently, as a result of risk inherently encapsulating the concept of control. While pre-modern times saw dangers as coming from gods, demons, and nature, under industrial modernity, society perceives itself as capable of knowing and controlling the dangers – risks are external and solutions internal. The turn to reflexive modernity marks a detour from this development of modernity, turning it on its ear: risk society appears as an alternative in which society represents a risk to itself (Beck, 1992). Beck's view is closer to my own, in that, rather than making an explicit separation between nature and society, he focuses on risk society's notions of control and technoscience. The society does not become a danger to nature so much as to itself. Some of the changes and contrasts between industrial and reflexive modernity are summarized in Table 1.

Table 1: *Differences between industrial and reflexive modernity*

Industrial modernity	Reflexive modernity
Trust in knowledge and science	Knowledge and science as having their limitations
Nature and tradition as sources of threat	Society itself as a source of threat
Risks being external to society	Society posing a risk to itself
Risk being calculable	Risk as unable to be calculated

Even though risk cannot fully be calculated under reflexive modernity, we still try: we now aim at calculating the incalculable and at colonising the future. Risk has not increased; what has changed is how it gets attached to society, in what Beck (2002) has called a process of **de-bounding**. This process takes place on three dimensions: the spatial, the temporal, and the social. On the first, the spatial dimension, it is implied that risks do not honour national boundaries; they are portrayed as taking on global scale. As for the second dimension, the temporal one, dangers are latent, and we cannot see the connection between their genesis and their effect. Difficulty is painted along the third dimension also. The current configuration of risk entails difficulties in determining liability, as risks are caused by complex social processes and even the attempt to find a solution for potential risks creates conflict. In what Beck has called 'organized irresponsibility' (Ekberg, 2007), complex systems are felt to be so big and numerous that change, causality, and responsibility are difficult – if not impossible – to ascribe to specific actors.

It is important to note that, whilst both Giddens and Beck have described risk society as a globalised process, this does not translate into worldwide homogeneity of risk or its handling. As Beck (2002) notes, the so-called periphery often experiences risk as an exogenous process. In other words, risk agendas are set, dealt with, and managed via decision processes that take place in non-periphery countries. This describes quite well some of the inequalities in global health governance that I noted in the introductory chapter. These imbalances are an important part of international conflicts of globalised threats, and they feature recurrently in how certain identities and categories are conceptualised and interlocked in institutional and technoscientific narratives of threat.

Beck's (1999; 2004; 2006; Beck & Levy, 2013) attempt at expanding his conceptualisations of risk society beyond the borders of the 'Western world' may not have been as successful as the initial conceptualisation I outlined above (or at least may be more readily problematised). In his revised conceptualisations, Beck started to refer to 'world risk society' and conceive of a shift that, though closely connected with Western ideas of progress, has had a much broader effect and has roots in global dynamics. The idea of world risk society is closely bound up with what Beck has called 'cosmopolitanism', which is a specific way of understanding global relations (Beck & Levy, 2013). In the

next chapter, I will return to discussion of the effects of risk in the world and to considering what societies (or parts of them) are deemed at risk when we talk about pandemic threats. For now, it is enough to remember the most basic characteristics of risk society already identified: a generalised state of risk, limits to the production of knowledge, and a felt need to anticipate and know the future.

2.1.2 RISKS AND AFFECTS: FEAR OF RISK

I want to address one more building block before turning the focus specifically to issues of security and anticipation: how the generalisation of risk influences our day-to-day life. In this connection, I take the generalisation of risk in risk society to have an affective impact on populations but also often on the way pandemics are dealt with at the institutional level. Focusing on affects means stressing the relevance of embodied experiences that go beyond the meaning-making processes on which social constructionist social sciences have often fixated (Whatmore, 2006). At the crossroads of risk and affects, authors such as Furedi (1997; 2007; 2008) and Massumi (1993; 2005a; 2005b) have offered some readings of how uncertainty and undefined threats can trigger collectives' and individuals' affective responses. Although fear has not received as much attention as risk – very often confined to being 'the invisible companion to debates about risk' (Furedi, 2007: 1) – these authors have argued that it is fundamental to apprehending how societies and individuals interact with upcoming threats.

For example, Furedi has described the effects of risk society as coalescing in a 'culture of fear'. From Furedi's perspective, the anxiety that may result from risk society form in the imagination of society as a whole (Furedi, 1997). In other words, it is a collective phenomenon. However, there is a contrast against this collectivity. While the culture of fear is built through collective imagination, fear as an affect is most likely to be experienced as a private emotion (Furedi, 2007). According to Furedi, this is among the paradoxes of risk society, one by which, while the nervousness, anxiety, and fear are shared, there are many forms in which they translate somatically to individual responses, varying from body to body (Massumi, 2005a). The collective and individual-level experiences are mutually entangled through risk formulations and affective reactions.

The culture of fear also includes a swing from probabilistic to possibilistic thinking (Furedi, 2008), with all futures seeming much darker when looked at through the lens of possibilities instead of probabilities. According to Furedi, possibilistic approaches, which are dominant today, help to normalise expectations of worst-case scenarios (one of the main tools in conceptualising upcoming pandemic threats and designing pandemic response) and 'giving up'

on attempts to understand the event that needs to be countered. Thereby, they intensify a sense of impotence, which, in turn, strengthens the threat.

Massumi (2005a) has taken the argument about fear one step further, describing the current security-based approaches to various types of risk as 'fear of fear itself'. As risk expands, fear of unwanted events becomes the new norm. Emergencies – events that once were articulated as extraordinary – are now presented as the new normality. In the case of pandemics, the pandemic event is taken as a given, even if its characteristics remain undefined by dint of the limitations of knowledge[10]. Everyday practices and objects such as travelling, close physical interaction, a backpack at a metro station, or the day's post can be defined in terms of their pandemic potential, triggering a control-oriented response.

Thus, fear becomes a necessary element of our day-to-day life, being perpetuated through loops of affect wherein fear of a virtual threat becomes fear of fear itself. In a highly illustrative example, Massumi analyses the terror alert system implemented in the US after the 9/11 attacks, which works on the basis of a colour-based classification wherein green is 'low', blue is 'guarded', yellow is 'elevated', orange is 'high', and red is 'severe'. The first thing Massumi noticed is that this spectrum leaves no possibility of absence of alert. Threat, the cause for fear in this case, is always present. In Massumi's (2005a: 31) own words, 'insecurity, the spectrum says, is the new normal'. An equivalent model is visible with regard to biological threats, as in the case of the alert system created for influenza pandemics (Caduff, 2015). During my research, I noticed that the WHO description of the phases in the influenza pandemic too leaves no space for the absence of threat (see Figure 1). The lowest ebb, which is often referred to as 'interpandemic', assumes the latency of the next pandemic. While recognising the absence of infectious disease in humans in this phase, it acknowledges the existence of influenza strains circulating in animals and the omnipresent potential of such a strain to eventually mutate and infect human populations. Therefore, even if the level of threat is at its minimum, it still elicits a cultural and affective response, which is, as Furedi has said, both collective and individual.

[10] Pandemic events are almost the opposite of what Elizabeth A. Povinelli (2011) has called **quasi-events**. Though part of our social worlds, quasi-events neither happen nor do not happen. Rather, they are part of a continuum in which there is no agent with an interest in identifying them as events in themselves; they are material practices that do not stand by themselves even if they are present. They can be seen between social worlds yet cannot claim an identity of their own. These can be considered the opposite of the pandemic event: whilst the pandemic event is a catastrophe before it takes place (its consequences are responded to before they are known, they are taken as a given), the quasi-event is never recognised, no matter its practical and material enactment. The pandemic, on the other hand, is fully recognised in the absence of actualisation.

Figure 1 The continuum of the pandemic phases, as presented in materials from the World Health Organization (2013: 7)

For Massumi (2005a), these processes are a result of the looping of the fear and threat reactions. Because Massumi's conceptualisation is fairly complex, I have divided the process into nine steps for elucidation of his points (see Table 2). The looping process starts with the shaping of the upcoming threat. As that threat is both without form and without content, its form is rather rooted in its temporality, its status as potential future. The threat must remain unknowable since knowing its specifics would render the threat controllable and, accordingly, the event would cease to be threatening. The second step sees the future threat made present, creating a fear response. This means that fear and threat, whilst existing in different tenses, become simultaneous. They both become transtemporal objects. For the third step, Massumi calls back to psychologist William James (James, 1950; 1983; as cited by Massumi, 2005) to describe the bodily reaction when one is faced with fear: 'Fear strikes the body and compels it to action before it registers consciously. When it registers, it is as a realization growing from the bodily action already under way: we don't run because we feel afraid, we feel afraid because we run' (Massumi, 2005a: 36). In the fourth step, the affect and the action are now simultaneous – they start at the same time. Next, while the action or response dissipates, the affect keeps accumulating. This enables the sixth step, reflection, wherein the event that takes place is reviewed retrospectively and mapped as an objective environment. Here, both fear and response are reflected upon, which allows us to name, identify, and hence think about the threat and the response. Through this, the fear can be turned into an event that itself is able to be anticipated. It is in the vital seventh step where the previous steps come together. Being able to name, identify, and think about the recalled feeling, the affect, one's response, and the future threat is what allows anticipation of the affect; i.e., it is what allows fear to be manifested in the wake of anticipation of fear. Through this step, the response that earlier took place in the face of the

anticipated **threat** can now take place in the face of the anticipated **fear** while still unleashing the same automatic, non-reflected-upon reaction that takes place before the situation itself is processed consciously. One of the key consequences of the seventh step is that the threat need not be spatially near: as Massumi (2005a: 41) stated, 'an alert about a suspected bombing plan against San Francisco's Golden Gate Bridge [...] can have direct repercussions in Atlanta'. The eighth step turns anticipated fear into **fear of fear itself**. In this, the affect loops back to the beginning and acts as the cause of fear, finally opening the space for fear becoming self-sustaining, becoming an autonomous force. Fear has the ability to loop indefinitely.

Massumi has also called this self-sufficiency of fear 'the birth of the affective fact', which functions as a key political operator. The affective fact, however, encompasses the concept of disruption and is portrayed in more general terms as functioning in a tautological and very simple manner: 'Threat triggers fear. The fear is of disruption. The fear *is* a disruption' (Massumi, 2005b: 8).

I believe that viewing fear as a companion to risk aids in understanding the sense of emergency that is constantly brought to bear in the fight against pandemic threats. Worst-case scenarios and imagined catastrophes are recurrently used as justifications for the drafting of pandemic plans directed at fighting uncertain events. Alert systems are, as Massumi has pointed out, ways of calibrating and regulating fear, handling and governing collective affects in anticipation of particular events. And these processes play a highly relevant role in the sort of boundaries that can and cannot be justified in efforts to help secure the health and lives of populations and societies.

Table 2: *The 'fear of fear itself' loop, adapted from earlier work* (Massumi, 2005a)

Step	Phase in the affective loop
1	Threat is shaped as a future occurrence.
2	Threat is made present through fear.
3	The body responds to fear before registering it consciously.
4	Affect and action are distinct but simultaneous.
5	Affect and action are differentiated: action dissipates, and affect accumulates.
6	Fear and response are reflected upon. The fear becomes an event that can itself be anticipated.
7	The anticipation of the fear as an event creates a response of fear.
8	Anticipated fear becomes fear of fear itself.
9	Fear becomes self-sufficient.

2.2 (BIO)SECURITY, PREPAREDNESS, AND ANTICIPATION

As I have already mentioned, my main aim in presenting risk society and its relationship to the culture of fear is to lay out the context in which pandemic policy is made possible, a context wherein an uncertain threat can occasion multi-million investments in preparing for threats that are yet to come, even yet to be identified. Risk society and a culture of fear serve as the backdrop against which organisms implement biopreparedness policies, which are aimed at preparing for uncertain threats and then responding to them when they rear their heads. The preparation process when viewed against this backdrop clearly goes beyond preparing, to defining and shaping those threats. In this, 'preparedness' represents a shift in the very logics behind the implementations over the last 20 years, with what various literature has described as a turn to preparedness (Caduff, 2008; 2015; Collier & Lakoff, 2008a; Keck, 2008; Lakoff, 2006; 2007; Samimian-Darash, 2009). The leading way of thinking about and facing upcoming disasters echoes a dominant logic now applied to a spectrum of events as wide as threats to infrastructure, security, environment, and health. The process has, in fact, tied those diverse types of threat together, as I will explain below.

With this section, I focus on how these logics play out in practical terms. I begin by outlining a genealogy of the logics of anticipation. This outline is informed mostly by literature situated in the field of biosecurity studies. Of course, since preparedness logics cover a wide spectrum of threats, with preparedness also forming part of an extensive pattern in security and risk studies (Anderson, 2010; Collier, 2008), I will occasionally draw also on literature related to wider anticipation schemes, especially with regard to national security and terrorism. Hence, it is inevitable for my focus on biological threats of pandemic potential to admit some examples from other areas. In particular, the policy realm, with nets cast wide to attend to all kinds of hazards, tends to encompass threatening agents of diverse backgrounds: a single preparedness policy may well cover the biological, nuclear, chemical, and radiological. To illustrate the wider logics at play in relation to pandemic threats and show how they influence actual policy-making, I also explain some of the general preparedness practices and techniques documented by existing literature.

2.2.1 THE LOGICS OF ANTICIPATION

When introducing and discussing risk society above, I especially stressed the ubiquity of risk, the limitations of knowledge, and the focus on future events. This is because, as I reviewed literature on pandemic threats and biosecurity,

I noticed that it is in relationship to those elements that reflexive notions of risk have become relevant. The pattern is visible mostly in government institutions' constant attempts at calculating future threats. As characterised above, risk society came about largely in consequence of scientific and technological progress and the manifestation of limitations to knowledge-making. In line with the will to calculate the incalculable, pandemic policies rely on specific logics of anticipation (Anderson, 2010), or rationalities of risk (Keck, 2008), which are largely evocative of that progress and knowledge-making that characterize risk society. The idea is that by anticipating future happenings, policy-makers can develop policies aimed at covering unknown events. According to Ben Anderson (2010: 12), these logics are 'coherent way[s] in which intervention in the here and now on the basis of the future is legitimized, guided and enacted', with the goal being 'to care for a valued life by neutralizing threats to that life'. As I will argue later, it is important to remember that threats are posed not only to human life but also to other, even non-living entities.

These logics have evolved in the course of recent decades to reach their current state (Keck, 2008). This is not to say that any has been replaced by another. Rather, they accumulate in an overlapping manner. In this cross-breeding, they work similarly to the legal, disciplinary, and security techniques that Foucault (2008) compares as dominant logics for governance of life across different historical moments: the process is not one of substitution but rather of improvement and added complexity. These logics together serve as the foundation of pandemic policy-making, practices, and implementations, yet I have been able to find four differentiated types, identified in my literature review as prevention, precaution, pre-emption, and preparedness.

The first of these, prevention, relies on prevalence and incidence data. The rationality is rooted in cases and propagation zones, and knowing the enemy means being able to fight it (Keck, 2008). This logic type stems from conceptualisations of security from the 19th century, when there was strong trust in scientific knowledge for control of risk (Kittelsen, 2009). Under logics of prevention, the enemy is deemed to be a visible one. These logics are strongly connected to the optimistic perspective on science and technology that is characteristic of industrial modernity.

The second type, precaution, should be understood in a wider sense than prevention. Inspired by the 'precautionary principle' (Anderson, 2010; Kittelsen, 2009), it emerges in the 1970s. It has two main characteristics: 1) the action is separated from the processes acted upon, and 2) the action takes place before the identified threat reaches a state of irreversibility. The key question asked is one of proportionality: is the act in keeping with the threat? That concern creates a necessity for continuous reassessment. According to Frédéric Keck (2008), a logic of precaution, in contrast against prevention, strongly pays heed to the limitations of knowledge while precaution focuses on the knowledge that **is** available. Amidst limitations, the possibility of a reliable

prediction is cast into doubt. Deficiencies in knowledge and the inconclusive nature of the available information prompt actors to take a leap of faith and proceed to intervene even if the risk has not yet been ascertained (Caduff, 2014).

The third logic class is pre-emption. Pre-emptive action, according to Melinda Cooper (2006), who analyses it in the context of warfare, is the launching of a counterstrike if there is evidence of an imminent attack. As the notion of war moves from 'Cold War' to 'terrorist networks', the attacks become unpredictable; where the Cold War counted on the reliability of a fixed opponent, the rhetoric of war against terrorism depicts enemies as unidentifiable, uncertain, and unpredictable. Cooper acknowledges two postures in relation to pre-emption, a passive and an active one. The former calls back to the above-mentioned precautionary principle, with the objective being to halt the development of any technology that might represent a threat. Those taking an active posture, which corresponds to the principle of counter-proliferation, seek to produce more of whatever is the source of threat (e.g., proliferation of bioweapons to counteract possible biowarfare). For Ben Anderson (2010), pre-emption possesses several similarities to precaution but the difference appears in the fact that, while precaution involves trying to halt something before it reaches the point of no return, pre-emption acts on threats that have not yet emerged. Pre-emption has yet another defining feature, though, found in its performative character. As argued by Marieke de Goede, Stephanie Simon, and Marijn Hoijtink (2014), pre-emption does not pre-exist its practice. It needs implementation if it is to become effective, actual, and influential – i.e., if it is to have an effect on reality.

That is the sort of twist that preparedness, the fourth logic type, offers. The effect takes place before the practice, for the stress is on the existence of the threat even before action on it. This effect takes place not only before the threat materialises but even before the threat is defined or identified. Cooper (2006) finds in the work of René Dubos (1959) and in his concept of 'alertness' the seed for the family of preparedness logics. Dubos formulated a shift according to which one must respond to the emergent before it is actualised. In Cooper's opinion, Dubos was at odds with the mainstream of public health, and indeed an examination of biopreparedness policies puts his idea squarely in line with later public-health logics, of the 21st century. The main departure of preparedness from previous logics is that it focuses on the consequences of a future event instead of on that event itself. The question has become not whether we must prepare or not for a given event but how and for what (Lakoff, 2006; 2008). In consequence of the sense of inevitability, preparedness policies are often aimed at preparing for the aftermath by trying to stop the effects instead of trying to stop the threat itself (Anderson, 2010). At the same time, logics of preparedness tend to identify several sources of threat as a unitary threat, as

mentioned in the previous section. Because of this, elements of public health, national security, and science (Collier & Lakoff, 2008b; Samimian-Darash, 2009) are thrown together into a melting pot of strategic approaches that configure the future event irrespective of the difficulties in apprehending its temporal and emergent dimensions.

To take into account the focus on the consequences and the merging of several sources of threat, one must adopt an 'all-hazards approach' as referred to above in connection with the IHR, whereby a response plan should cover every type of hazard attached to a given spectre of threat. Given the variety of possible threats and their overlapping nature, **all** kinds of threats fall under the same category. Now, not only do otherwise distinct biothreats get pulled together into one unique source of menace – bioterrorist attacks, natural outbreaks, and laboratory disasters are unified in terms of policy, as indicated in the introductory chapter – but also non-biological threats enter the mix. This category is known as CBRN threats, where the initialism refers to chemical, biological, radiological, and nuclear threat. All these types are characterised by unpredictability, but they remain distinct from each other at many other levels. In terms of prevention, precaution, and pre-emption, they should not be regarded as identical, yet from the standpoint of preparedness they are the same (see Table 3). Since we need to prepare for action before an unknown happening, the happening stops being important and in that sense can be regarded as identical to the rest (deliberate or accidental, chemical or biological). What matters is to deal with the potential consequences.

Table 3: *Changing features in evolution of the logics of anticipation*

	Availability of knowledge	Temporality of the action	Characteristics of the threat
Prevention	Available	Contemporary with the threat	Visible
Precaution	Limited	Prior to a point of irreversibility	Concrete but uncertain
Pre-emption	Limited	Previous to the visibility of the threat	Concrete but uncertain
Preparedness	Limited	Previous to the visibility of the threat	Variable, multiple, and uncertain

2.2.2 PRACTICES FOR PREPAREDNESS

We can now flesh out the outline by looking at preparedness practices or techniques, in which the logics I just described take a concrete and practical form. Such practices imagine, represent, and manipulate events so as to address various scenarios. These constructed scenarios are based on data but also imagination. Thereby, they help to construct specific threats, and, in

consequence, guide policy-making and implementation in specific directions. It is worth remembering that one result of constructing scenarios is that each scenario created leaves some other possibilities out. Certain events are put to the side, peripheral to the focus of attention of the preparedness apparatus when other events are defined as the relevant ones (Collier et al., 2004).

Preparedness practices can be understood on the basis of three types of practices of anticipation: calculation, imagination, and performance (Anderson, 2010). According to Peter Adey and Ben Anderson (2012: 100), these are 'techniques that stage events in order to make it possible to practise and address particular scenarios – the what-ifs – by rehearsing response to emergencies'. They are designed as parts of policy implementation while simultaneously shaping future policies:

1. Calculation includes threat prints, data-mining, impact assessments, trend analysis, and complexity modelling of various forms. What these techniques have in common is that they measure the world and generate multiple possible futures. The effect of future events is made present through numbers and mapping. Calculation practices allow threats to be understood as measurable risks.
2. Imagination – alternatively, scenario development, in the nomenclature suggested by Andrew Lakoff (2007) – is the opposite of calculation in that the attempt is to follow the openness of future events. It includes acts of creative confabulation such as visioning, future-basing, link analysis, and scenario-planning. Affects play an important part in the creation of such representations. These are exploratory methods for seeing possible impacts of future happenings.
3. Performance – alternatively, simulation exercises for Lakoff (2007) – includes acting, role-playing, gaming, and pretending. It is connected to imagination in its basic premises but makes use of embodied experiences. Inspired by theatre, drama, and play, it is carried out through exercises, war games, and simulations, all aimed at generating knowledge about events that have not taken place before and at producing capacities that enable predictable response while connecting the future with current materialities (Adey & Anderson, 2012).

The three practices types share very similar objectives, principally to make present threats that are situated in the future – i.e., to rehearse the actualisation of virtual events. Where they differ is in how they reach this goal. It is through bringing the future to the present that preparedness policy-making is developed. The practices, in making that future present, create a very specific kind of event that is both future and present, concrete and

uncertain. While the event still has not happened, it has an influence in our reality: it affects our policy-making, our policy implementation, our vision of upcoming threats, our development of science and technology, and – we should not forget – our fears and affects.

2.3 BETWEEN VIRTUAL THREATS AND ACTUAL EMERGENCIES

While I mentioned virtual and actual events in the previous sections without delving into much detail on these concepts, they are central to how pandemic threats are thought of and constructed, and we can discuss them fruitfully at this juncture. Virtual events are a result of preparedness logics blurring the division between the threat and the emergency. **Although the declaration of a PHEIC plays an important role in triggering an international public-health response, a response is well on its way before the emergency is declared: the event has been present in policy and implementation imaginaries for a long time.** In fact, the response during the emergency phase could not take place without the prior construction of the threat and the mechanisms already deployed (a more detailed description of preparedness mechanisms is given in Chapter 5).

The threat and the emergency in their relationship are what Samimian-Darash (2011; 2013) has referred to as 'virtual' and 'actual' events, using the conceptualisations that Deleuze developed in his book *Difference and Repetition* (2012). The relationship between the virtual and the actual is very much at the centre of most boundary-making processes that I refer to in my analysis. Indeed, it is the ambivalence between virtual and actual events that makes preparedness work possible. This blurring between the threat made present and the upcoming emergency is what allows threats to have an effect on reality well before they materialise – and even without them materialising at all. A dichotomous way of understanding this relationship would position preparedness as a way to face threats and response as a way to face emergencies. However, as I will argue in due course, these two processes cannot be separated and actually co-construct each other.

The first important distinction drawn by Samimian-Darash (2011) is among possible, virtual, and actual events. Possible events are already defined, and they are not unspecific. This does not mean that possible events are certain to occur. Even if the identity of the event is entirely unambiguous, the **realisation** of the event, the actual happening, remains uncertain. Samimian-Darash uses the example of preparing for a possible smallpox epidemic in Israel: The event has taken place before and is well-known. Therefore, the system is already aware of the measures that apparently need to be taken. At the centre of the response is, most importantly, a vaccination campaign. However, such campaigns always involve some risk of death and complications in vaccinated individuals (even if affecting only a small

proportion of the population), so a question remains as to whether they should be implemented or not. Is the calculated risk worthwhile in light of the uncertainty of realisation of the event? In summary, during possible events, risks can be calculated, and decisions can be made accordingly. The possible event is already defined, but the policy-making and implementation apparatuses do not fully trust in its actualisation so might be reluctant to take risks by implementing the known measures.

The virtual event, in turn, has not yet been defined, nor will it be until it is actualised. Neither are the risks known or calculable. Therefore, imagining and performing events that have not yet taken place will render those events virtual, **where 'virtual' here means that they are going to have an effect not only on the preparedness measures taken but also on the way we will construct and interpret future events that may come to pass.** The virtual event is, therefore, a pre-event (Samimian-Darash, 2009) and has an effect even before it happens. Samimian-Darash (2009) uses preparedness work against an unknown strain of pandemic influenza as an example. There are records of previous pandemics, but the identification of a new strain that is capable of sustained transmission between humans will mark a pandemic that has its own features. In other words, the morbidity and infectivity are unknown, as are the public-health measures, antivirals, and vaccines that will be effective against the new strain. As the actual event has yet to happen, preparedness is carried out on the basis of the construction of that virtual event. Most important is that all preparedness activities condition how health organisations and governments will respond to an actual event when it takes place.

A good example is the pandemic of influenza H1N1 that took place in 2009. The WHO and many national governments had long been preparing for a pandemic provoked by an avian H5N1 strain. However, when a pandemic came, it was actually caused by a different strain and originated in a different animal reservoir: the H1N1 virus came from swine populations. Still, many of the drugs, vaccines, and response mechanisms used were taken directly from avian H5N1 pandemic preparedness plans and protocols. The result was controversial, with the WHO's handling of the pandemic being highly criticised by media entities and experts in academia alike. The controversy was summarised very well by Margaret Chan (2010) herself, who was Director-General of the WHO at the time: **'[T]he world was better prepared for a pandemic than at any time in history. But it was prepared for a different kind of event than what actually occurred.'**

It should be noted that the systems producing those virtual events (through the anticipation practices mentioned above) are 'not intended to produce a diagnosis of an actual event before it has taken place', according to Samimian-Darash (2011: 297). Rather, their objective is to generate information related to the multiple actualities that such an event could become. Therefore, the

system keeps producing virtual events and updating them as new information is fed to it. There is no simple correspondence between one virtual and one actual event; the relationship is instead between a multiplicity of virtual events and a multiplicity of actual events that contribute to shaping each other. In the case of an influenza pandemic, the outbreak needs to be constructed in a manner accounting for previous (though not identical) pandemics but also taking into consideration the available (and unavailable) data and the development of imagined scenarios. This constructs a type of emergency based on recorded past, available present, and imagined futures that will condition our readings of any actual emergency.

We can refer directly to Deleuze's (2012) work, describing the possible as set in opposition to the real since an event occurring realises that event. Accordingly, once the event is realised, it is no longer a possible event but a real event. In other words, if a smallpox epidemic takes place, it is realised and, therefore, is not a possible event anymore but a real one. **The virtual, on the other hand, is not opposed to the real; it is fully real.** The virtual, alongside the actual, is one of the two halves that form reality. The virtual events produced by anticipation mechanisms and the actual events that take place are key in defining the event itself. Let us return to Samimian-Darash's examples to give content to Deleuze's work: a pre-event configuration can promote changes in the actual configuration of an event (Samimian-Darash, 2009). In other words, how we prepare for an event – operating with elements such as the tools, the mechanisms, the stockpiles, and the recorded data that we use to counter the event – plays a crucial role in how the actual event is finally configured.

Having clarified the concepts of the possible, the virtual, and the actual as fully as I can in light of the difficulty added by the need to decipher the often-cryptic language of Deleuze, I can turn to the important task of discussing, by way of summary, what role uncertainty plays in possible and virtual events. Samimian-Darash (2013) identifies the types of uncertainty present in possible and virtual events as 'possible uncertainty' and 'potential uncertainty'. A difference can be seen between these two types of events in the way they influence and condition preparedness work. On one hand, with 'possible uncertainty' the event is known while its realisation is uncertain. On the other hand, 'potential uncertainty' refers to the form of the event itself remaining uncertain. Not only is it unclear when it will happen – though, we should remember, preparedness policies insist that it most definitely is going to happen and we just do not yet know when, in what form, and how (Lakoff, 2006; 2008) – but even what will happen remains uncertain.

I find Samimian-Darash's conceptualisation to be very closely connected with the difficulties enmeshed with the affordances and knowledge limitations that are characteristic of risk society. More information and more data will push the construction of virtual events in a certain direction. At the same time, the multiplicity of both virtual and actual events is conditioned by the openness of the future. This does not mean that with enough information and

data the virtual event will be ultimately pushed to being equated with the actual event or that enough knowledge would allow us to control the event when it does get actualised (this would actually turn the virtual event into a possible one). The logics of preparedness themselves avoid that move through the enactment of anticipation practices such as imagination and performance practices. Hence, knowledge applied together with elements such as risk assessments, simulation exercises (Lakoff, 2007), use of planning assumptions, the construction of pandemic narratives (Caduff, 2015), and even narratives suggested by works of fiction (Elbe et al., 2014; de Goede, 2008) is used to shape the virtual events that have not yet taken place. **The various alternatives always offer some line of flight, some space devoid of hard data that will give room for virtual events to take new directions and gain new multiplicities**. These new directions are not arbitrary or infinite. Preparedness reacts to the existence of certain scientific and technical 'facts' or 'evidence', to arguments proceeding from certain agendas related to upcoming events, but those agendas and scientific facts are in constant change and development. Therefore, the rationalities of risk that characterise risk society, bundled with the logics of anticipation offered by the preparedness apparatus, always find a way to define new threats when the actual ones are not in line with the apparatus's expectations.

2.4 MOVING FROM RISK TO UNCERTAINTY: DISCERNING THREAT

I started the chapter with a parallel between preparing for research and preparing for threats and emergencies. Perhaps what is at stake is rather different between these two examples, but the processes follow similar steps: calculating risk and dealing with uncertainty, imagining the future, striving to pre-emptively tackle potential challenges, and dealing with the affective outcomes created by the unknown.

With this chapter, I have reviewed literature that deals with these steps in the context of security and pandemic threats. I believe that the various perspectives in the literature are all complementary ways of understanding how biological threats and future events are conceptualised and prepared for. Firstly, risk society is rooted in a new way of relating to future, knowledge, science, and technology. The main idea can be simplified thus: Risk becomes generalised. Secondly, a culture of fear appears as the other side of the risk coin. Since risk is everywhere, a state of alert becomes the new normality. This activates a fear loop that is constructed collectively and experienced by the individual, whereby the affective response is activated before the prospect of fear – a manifestation of what Massumi called fear of fear itself. In a third thread of development, the logics of anticipation employed for facing certain

threats have undergone a series of shifts that have brought new ways of relating to future events. To prevention, precaution, and pre-emption we must now add preparedness. This fourth type of logic has arisen as a way to deal with the limitations of our knowledge in the face of variable, multiple, and uncertain threats. Preparedness can be summarised as acting before a threat is visible, by constructing virtual biological threats via practices of anticipation. Finally, anticipated threats can be conceptualized as virtual threats that appear as fully real threats. They do not only condition the way we prepare and organise society for an eventual biological emergency but also condition the way we read and understand actual events once they take place.

Several stances on the ability to deal with biological emergencies by applying knowledge became apparent as the chapter unfolded. Indeed, there are clear differences in how risk and uncertainty position themselves in front of knowledge. For example, Paul Rabinow argued during an interview with Keck (2014) for *Public Culture* that risk is based on the accumulation of long series of statistical data while, on the other hand, uncertainty and the security apparatus in the context of biosciences live with the absence of such statistical records. Hence, risk and uncertainty represent two distinct types of intelligibility that differ in the mechanisms they offer to deal with upcoming threats to life and society. That said, if we go back to some of the arguments surrounding risk society, clearly the limitations to knowledge do play a very important role in the way risk has become generalised. **I believe that, while it is true that risk and uncertainty differ in the associated schemes of intelligibility with regard to most upcoming threats, they also coexist constantly, as pandemic preparedness and response incorporate both calculable risk and incalculable uncertainty**. In fact, preparedness techniques such as stockpiling or the construction of scenarios are constantly on the edge between available and unavailable knowledge, or between risk and uncertainty. We can return to Samimian-Darash's argument: preparedness systems constantly reconstruct virtual threats in light of newly available information that is fed to the system. This does not mean that all information available is always in the system, but it does validly depict risk and uncertainty as often co-occurring logics, a relationship that is integral to the upcoming analysis.

For a conclusion and bridge to Chapter 3, **I argue that the mechanisms I have expounded on in this chapter have one thing in common: they all are part of efforts to discern what a threat is and how that threat is configured**. Defining certain objects, events, or even living beings as threats has an underlying consequence that the literature often overlooks: it also defines an object that is vulnerable to the threat. Furthermore, the anticipation enterprise defines expertise in governing the relations between threat and vulnerability effectively. As Foucault (2008) has argued, the emergence of security devices in the 18th century took place in relation to the emergence of a new object of governance: the population. I believe that preparedness redefines the role of populations with regard to security. While

populations remain an important part of the way security and health are articulated, preparedness redefines the vulnerable collectivities as multiple, hybrid, and dynamic objects. One of the main objectives behind preparedness is to keep the threat away from populations but also from wider assemblages that include vital infrastructure (Collier & Lakoff, 2015).

This chapter has functioned as a literature review that delineates the starting point of my research. With the next chapter, I continue the discussion of prior literature, but the gaze is oriented towards constructing a frame that contributes to nuanced understanding of my analysis. In other words, while in this chapter I have presented literature **to build from**, in the next chapter I present literature **to build with**.

3 MORE-THAN-HUMAN BOUNDARIES, CATEGORIES, AND IDENTITIES

> *I have my first face-to-face interview with an informant. He is a preparedness expert working with the EC. The EC feels so far away, so distant. High, actually. The word is 'high'. I wear a shirt (I never wear shirts). I remove my earrings (I never do this, except for a smoke sauna). I arrive clean-shaven (I never fully shave; I just trim). I know that he is just a person who just happens to know about a specific topic of interest to me, but everything that surrounds the situation makes it intimidating, as if I were invading alien territory: arrangement of the appointment with a secretary, the confidentiality measures, the security in the building, the person taking notes during the interview, the international travel for a 30-minute conversation.*
>
> *Recollections for a Research Diary, March 2014*

My informant gave me more than an hour of his time, encouraged me to ask more questions than the ones I had prepared, made a great effort to answer clearly, and tried to stay in touch with me after the interview, but the way I thought of him in advance made him intimidating, almost frightening. He was beyond what I had considered to be my network of interaction: he was part of a group that I had othered – expert bureaucrats – and that I felt was, from a social perspective, threatening to me. But how had I come to identify him in such terms, this man I had never met? This identity of his was a result not of his individuality but of how he was assembled in connection with a specific context, a specific organisation. I know the EU, I hear about the EU, but I had never **met** the EU. The EU was for me a very abstract network of power and politics that I could only talk about, never interact with. Still, my informant was a part of it and I was about to make that first contact. The way I identified and categorised my informant did not exist in isolation; it was part of a wider assemblage that included the EU but also the building with its security guard, the city where the building is situated, and my informant's assistant. Similarly, other actors involved in pandemic processes – populations, animals, viruses, and health-care workers – are identified or categorised not in isolation but, rather, as parts of larger assemblages.

I concluded the previous chapter by hinting at some key divisions in pandemic preparedness: the lines between the threatening, the vulnerable, and the expert. In this chapter, I build a frame for my discussion of those divisions – in other words, a frame for understanding how various social actors, both human and nonhuman, are identified and categorised in institutional and scientific narratives. The identities of the actors involved, such as my EC interviewee, and how they relate to others are configured

through their connections with their social context and other social actors. These assemblages involve mutual entanglement of actors, meanings, and practices. It is central to my argument that **the identification of threatening, vulnerable, and expert assemblages cannot truly be associated with individual actors – whether the actor is a virus, a population, or an expert scientist – and that all are part of wider assemblages**.

Some examples might help to clarify what this mean for the three categories. Firstly, biological threats can be identified instinctively with the viruses that cause pandemics. These are, after all, at the centre of every pandemic event, whether virtual or actual. They are central to such an extent that they give the name to the pandemic (or pandemic scare)[11]. But they do not act alone: their associations with human agendas, terrorist groups, rogue states, wild or domesticated animals, insecure and unprofessional practices, and international transport and trade are among the elements that are crucial for the identification of a health event as of international concern. Hence, a pathogen's categorisation as threatening does not simply result from its intrinsic features. It is connected also with associations with other actors and their specific identities (I will expand on the processes that a virus follows in becoming threat in Chapter 7).

Secondly, in the case of actors identified as vulnerable, populations have entered the role as an object of governance during health emergencies (Foucault, 2008). However, they too are part of wider assemblages. As Stephen J. Collier and Lakoff (2015) have argued, also at stake in current security logics is infrastructure that is considered vital for the functioning of society. What needs to be protected here is society as a whole, with its populations but also with its government, infrastructural elements, economies, cultures, and territories[12]. Hence, the protection of vulnerable assemblages is dependent on their belonging to securitised contexts. In other words, only by belonging to vital system assemblages do other actors – human and nonhuman – come to be identified as vulnerable and in need of protection.

Finally, expert collectives and their capacity to protect society are not only associated with scientific expertise but also part of a wider governance and knowledge-making apparatus. Scientific institutions are enrolled through public and private funding, national governments prepare emergency plans and protocols, and international health organisations establish mechanisms

[11] There are many examples of this. For instance, one could refer to the 2001 anthrax attacks, the SARS epidemic, the threat of avian influenza, the H1N1 pandemic, the MERS-CoV outbreak, the Ebola epidemic, or the Zika virus epidemic.

[12] In these logics, as Michael Billig (1995) has argued, military enterprises have shown that when national security is at stake, there is something more to protect than life itself, there are things of greater value.

for co-ordination and collaboration. These associations make possible the knowledge, the resources, and the ability to keep the vulnerable out of the clutches of disease and its disruptive effects. Here, access to resources and control of them form a key element in becoming part of expert assemblages. Participation in preparedness and response processes related to pandemics is dependent on the specific positions occupied with respect to global health.

These tentative approximations are far from offering sufficient foundations for understanding the underlying logics of the boundaries that separate one category from the next. Rather, these initial reflections point us to a general path, with further tools. In this chapter I claim that two specific notions from the theoretical realm are especially useful for making sense of how boundaries, categories, and identities are established in preparing for and responding to pandemics. The first is the idea of more-than-human matters (Whatmore, 2006). **In defining the categories and identities that play a role in facing pandemics, associations between humans and nonhumans are what characterise the various features with which expert institutions describe the actors involved.** The second idea is that of identities and categories as defined intersectionally (Brah & Phoenix, 2004; Crenshaw, 1991). I read intersectionality here as going beyond feminist research to describe how **pandemic identities and categories are interlocked in the sense that they need to be considered together**. **In other words, definitions of threat, vulnerability, and expertise cannot be understood without their intersecting connection to national, spatial, gender, or class identities (and vice versa)**.

To clarify the frame, I have divided this chapter into four sections. I start by discussing why thinking of pandemic processes in terms of identification and categorisation holds promise for understanding how the various actors are depicted and understood during pandemic processes. This entails considering work by several authors that points to the utility of arguing for a more-than-human and intersectional understanding of identity and categorisation processes. In the second section, I draw on STS work to discuss several modes of categorisation that affect both human and nonhuman actors. Although I start by reviewing some of the basic studies that address how boundaries are understood as categorising devices, I will swiftly render things more concrete by discussing two specific ways in which boundaries are articulated and dealt with: via boundary work and in boundary objects. Thirdly, I argue that we can refer to processes of identification and categorisation in global health in terms of interiority and exteriority. To explicate this line of argument, I will review pertinent exchanges between Beck (2004; 2006; Beck & Camiller, 2005), who argued for understanding global politics in terms of 'cosmopolitan realism', and Latour, who refers to cosmopolitan visions of our world as a 'gentler case of European philosophical internationalism' (Latour, 2004: 458). From their discussion of what a cosmopolitan understanding of the world can be, the door is opened to some key questions surrounding threat and protection: What needs to be protected, and from what? How do we identify the actors that fall

into each category? Implicit in establishing notions of threat and protection – i.e., interiority and exteriority – there is a challenge of bringing threatening actors under control by implementing strategies of biological preparedness, security, and control. After this discussion, I devote the final section of the chapter to reflecting on what all this means for the constitution of particular actors from a pandemic perspective. What is a threat, and what must be protected from that threat? How do expert communities define these categories? How are spaces of care and intervention distributed in practical political processes?

3.1 IDENTIFICATION, CATEGORISATION, AND ASSEMBLAGES

In defining the various actors involved in pandemic processes, those with institutional and technoscientific perspectives are continuously engaging in processes of identification and categorisation. In these processes, health institutions describe the social actors involved as, variously, having characteristics that bind them to threatening, vulnerable, and/or expert assemblages. Hence, identities and categories are allocated to certain actors, which are tied to their specific roles in the development of pandemic processes accordingly. It is important to note that **when I speak of identities and categories, I refer to the moments in which those identification and categorisation processes are made more or less stable and productive**. So it is that, while the identities and categories I illustrate in the forthcoming analysis are always in the making, I consider the documents and interviews I analysed (see Chapter 4 for a detailed description of the body of material) to be instances in which those always-in-the-making processes are intensified and made productive.

To understand how social actors involved in pandemic processes are known and governed, I rely on the concepts of identities and categories for the possibilities these offer when brought together. As I will be arguing throughout this chapter, understandings of social identity have remained anthropomorphic (Michael, 1996). Pandemic processes offer a context in which such anthropomorphising becomes limiting. Indeed, the productive identities assigned by means of institutional and technoscientific narratives are shared and distributed among both humans and nonhumans. Categorisations and boundary-making, in turn, are often understood in the literature (see Bowker & Star, 2000) as processes of classification and organisation. Such approaches to categorisation and boundary-making are especially useful because of the manner of theorising on the limits between categories as always negotiated.

An understanding of pandemic processes that considers both identification and categorisation brings three advantages that become especially visible amid the richness of the analytical chapters. The first is that it allows me to describe the human and nonhuman actors that feature in institutional and technoscientific narratives by using the same categories and identities shaped as part of more-than-human assemblages. Secondly, it allows me to rely on notions of intersectionality – which has thus far been developed almost exclusively in the context of human identities[13] – to address how identities and categories become interlocked with each other during pandemic processes. Finally, I can use the notion of boundary-making as a lens for describing how identities and categories are negotiated in pandemic processes[14].

In the remainder of this section, I focus on laying out what an approach to identity that accounts for the nonhuman might look like, 1) by examining how Mike Michael (1996) has conceptualised identities as mediated by the nonhuman, 2) by discussing the work of geographer Sarah Whatmore (2002; 2006) and her understanding of social sciences as more-than-human, and 3) by discussing the potential of intersectionality to inform the ways the various identities and categories used in pandemic narratives interact with each other.

3.1.1 CONSTRUCTED IDENTITIES

As I mentioned at the start of this section, social understandings of identity have generally remained human-centred. Indeed, traditional theories of social identity have defined identity and identification as cognitive processes mediated by social interaction (Tajfel, 1981; 1982; Tajfel, Billig, Bundy, & Flament, 1971; Turner, 1987; Turner & Oakes, 1986). Later, relational approaches incorporated a turn to discourse, with emphasis on the formation of human social identity through language and meaning-making. With these approaches, scholars tried to reformulate views on identity by turning to more dialogue-based, interactive, and discursive approaches to social identity (see Gergen, 1991; Shotter & Gergen, 1989; Wetherell & Potter, 1992). In these approaches, identity is regarded as constructed through linguistic interaction and collective meaning-making processes. In other words, they emphasise the role of non-internal processes in the formation of identity and otherness rather than the effects of internal cognitive structures of thought[15]. Nonetheless, these approaches still take the construction of identity to be mostly a human-centred process. It is worthy of mention that perhaps only approaches with a

[13] Mel Y. Chen (2011; 2012; Hayward & Chen, 2015), discussed later in this section of the thesis, is one of the authors who have attempted to carry intersectionality into more-than-human territories.

[14] This point, while key to making the relevance of this section explicit, is not dealt with more extensively until Section 3.2, 'Boundaries in the Making'.

[15] For a comprehensive summary of these approaches under a critical light, see Chapter 2 of Michael's (1996) *Constructing Identities*.

focus on place identity have started to formulate the process in association with some nonhuman elements, such as space and territory (see, for example, Aceros, Cañada, Rodríguez, & Domènech, 2013; Dixon & Durrheim, 2000; Lalli, 1992; Valera & Pol, 1994). The most interesting steps toward de-anthropomorphising identity, however, have been taken by Michael (1996); in his book *Constructing Identities*, he explicitly presents an understanding of social identity as mediated by nonhuman actors.

Here, I argue that discursive approaches, whilst adding an intriguing alternative to classic social cognitive approaches, might be too focused on language and hence unable to provide the full set of tools necessary to make sense of the identification processes that take place during pandemic processes. My claim is that, **if we are to bring a useful conceptualisation of identity to the table that can describe how relevant actors are identified during pandemic processes, we need to go beyond human approaches to identity and occupy transdisciplinary spaces that may offer the tools to achieve new understandings of how the social categories are articulated**. This renders the social a wider category, one that encompasses animals, technologies, and molecular forms of life, along with other nonhuman identities, in contrast to narrower visions that reduce the social to cognition and the interaction among human individuals (even if mediated by the environment)[16].

In his work, Michael (1996), after introducing and discussing more classical approaches, draws on actor-network theory (ANT) to illustrate how human identity can be mediated by technology. His purpose is to bring the study of nonhuman influence on human identity one step further by analysing the influence of 'natural' nonhumans. In his case, this means other animals and the environment. One of the most salient steps taken by Michael is to question the subject/object divide through analysing the various configurations between human and nature by attending to four permutations of the object/subject and human/nature divides. This does not obliterate the subject/object divide but does aid in understanding the multiple ways in which

[16] It is worth emphasising that I do not suggest here that human-centred approaches to social identity are problematic *per se*, in all cases. Rather, they are limiting in the specific context addressed in this thesis, as they are especially constraining in contexts wherein human–nonhuman interaction is constitutive of the identity of the actors involved. Therefore, I do not question the value of the immense corpus on social identity that has been developed within the discipline of social psychology over the years. On the contrary, I am very much inspired by it, particularly by its dialogue-oriented, relational, and dynamic character. I aim at developing it further with the present work.

these divisions can be articulated and the consequences they have for the way we construct the world[17].

For the purposes of this thesis, this questioning of the subject/object divide aids in situating the emerging identities and categories of global health emergencies. When certain collectives or individuals – whether human or nonhuman – are identified as threatening, vulnerable, or expert, the possibilities that such categorisations enact are both objectifying and subjectifying. In other words, these categorisations offer a productive classification for the governance of global health but also offer specific categories that can be used in day-to-day life. For example, in cases of health workers getting infected during an ongoing epidemic outbreak, biomedical protocols started to treat them as a threat: they were isolated and submitted to biosecurity processes. This biosecurity performance, although motivated in terms of the objective view of pandemic response, also offered tools for subjectification with narratives of heroism or irresponsibility. While some health-care workers were regarded publicly as heroes[18], others could be deemed irresponsible by the authorities[19]. Thus, while categories of threat, vulnerability, and expertise are usually enacted as objective from the perspective of positions of power, they are translated – both in their use and in their wording – into available identities and categories to subjectify specific collectives and individuals.

This example shows that the human/nature and subject/object divides do not simply get eliminated. More is going on: in the way we use the various categories, how they are articulated leads to several ways in which categories and identities can be socially made productive. The following permutations are suggested by Michael (1996):

1. In **permutation 1 (human-as-object [me] / nature-as-object [it])**, both human and nature are contemplated as objective entities.

[17] One of the main contributors to this debate has been Philippe Descola (1996), who has taken a predominantly anthropological perspective to the way the subject/object divide emerges in different cosmological understandings of relationship between humans and nature. Although here the questioning of this divide remains mainly a tool to discuss other topics, some of Descola's ideas remain an important source of inspiration and therefore worth mentioning. More concretely, for Descola (1996, p. 98), supressing the idea of nature threatens "the whole philosophical edifice of western achievements". This step would render European modernity a much less successful globalizing project that would help bring closer the classic categories of identification of 'us' and 'them'. At the same time, Western society would be forced to reimagine its own cosmology as humans and non-humans "can no longer be comfortably managed by two entirely different sets of social devices".

[18] The magazine *TIME* named Ebola fighters – 'The ones who answered the call' – as 2014 Person of the Year. See http://time.com/time-person-of-the-year-ebola-fighters/.

[19] Teresa Romero was infected with Ebola in Madrid while caring for an infected Spanish missionary who had been evacuated from Sierra Leone. The Spanish government publicly blamed Romero for her infection, citing biosafety malpractice in her attending to the evacuated missionary.

In pandemic discourse, this perspective is often adopted for describing the social actors involved in pandemic processes as pure categories or identities: the virus, human, and animal populations, as well as the role of technology. In this permutation, human–nonhuman interaction is viewed in terms of a discourse of objectivity and universalism.

2. With **permutation 2 (human-as-subject [I] / nature-as-object [it])**, nature is seen as an object of human intervention. This is a narrative of control and responsibility. In pandemic discourse, this is often the articulation offered in description of the role of experts as acting subjects and the pandemic processes as technical objects that can be governed. Hence, this understanding is often present in scientific and institutional discourse: (some expert) humans are able to know nature from a privileged perspective.

3. **Permutation 3 (human-as-object [me] / nature-as-subject [Thou])** involves humans conceived of as part of a grander narrative submitted to the will of nature, Gods, or spirits. The fate of humanity is part of wider narratives related to an autonomous and grand nature. In the context of pandemics, as I argued in Chapter 2, there is a sense of inevitability to the threat: it will arrive, while we do not know when, in what form, or how (Lakoff, 2006; 2008). This articulation of human and nature can, however, be counteracted by expert scientific understandings of society.

4. Under **permutation 4 (human-as-subject [I] / nature-as-subject [Thou])**, both humans and nature are viewed as cognisant, reflexive, and volitional beings. Interacting with nature is an act of communication between humans and nonhumans. Indeed, some pandemic narratives (see Chapter 7 especially) depict nonhuman actors such as viruses and animals to be not so much cognisant as agentic. In the case of animals, the nonhuman can become cognisant and reflexive, especially in situations of compulsory culling because of a spread of disease or in its role as model for microbiological or pharmaceutical research.

Table 4: *The four permutations of the object/subject and human/nature divides, based on the work of Michael (1996)*

	Human-as-object		Human-as-subject	
Nature-as-object	1	Human-as-object (me) Nature-as-object (it)	2	Human-as-subject (I) Nature-as-object (it)
Nature-as-subject	3	Human-as-object (me) Nature-as-subject (Thou)	4	Human-as-subject (I) Nature-as-subject (Thou)

Thus, the context of pandemics and global health becomes an especially relevant case in which boundaries between object and subject are questioned (see table 4). Michael (1996) does not prioritise one permutation over another; rather, he relies on all of them as explanatory of the relations between humans and nature. In other words, they are all present in the relationship of humanity with nature through (sometimes differentiated, sometimes overlapping) existing discourses: the way we identify and categorise social actors during pandemic processes follows several of these logics as the moment seems to dictate. Blurring the subject/object and human/nonhuman divides offers new ways to understand identification processes and their crystallisation into productive identities. These are not objectively defined by expert subjects. Neither are they subjectively constructed by the social actors involved. Rather, they become more or less stable through their shared and distributed features: they extend through the networks where humans and nonhumans act and are enacted as both objects and subjects, with that enactment depending on how they associate with other social actors. In this way, **identities become shared, distributed, and jointly constructed among humans and nonhumans**.

This way of understanding identities blurs any possibility of a self-categorisation process. Hence, while more traditional understandings of identity generally rely on a self-identification process undergone by humans (whether mediated by the space and environment or not), stepping beyond the human implies understanding identity beyond the subject/object divide. That is, processes of identification take place through co-construction wherein the boundary between the knowing and the known fades away. With this description, I am not claiming a 'self-categorisation' process for nonhuman entities, especially since identity is foremost a human scientific construct. Rather, **here I claim that the groups we categorise among and identify when dealing with pandemic threats are formed of both humans and nonhumans and that each of the two is crucial in articulating the identity of the other**. Therefore, rather than talk about identification as a process that consists of self-categorisation, I consider it more fruitful to think of identification as a collective process that allows us to group human and nonhuman elements in collectives that share features,

characteristics, and potentialities. And in that grouping and identifying, we become identified ourselves.

3.1.2 A 'MORE-THAN-HUMAN' APPROACH

To contribute to this wider understanding of categorisation and identity, I rely on the conceptualisation of social sciences as a more-than-human matter, as formulated by Whatmore (2002; 2006). In her work, she has argued that more-than-human perspectives can be profoundly relevant for geography and for the social sciences in general. I conclude that many of the arguments she employs are valid for understanding how different actors are identified and categorised in light of pandemic threats.

Whatmore (2006) has summarised the characteristics of such an approach via four 'materialist returns' or 'commitments', which consist of shifts that update traditional understandings in the social sciences, alongside other points, which complement the more-than-human understanding.

1) **From discourse to practice: Identity is no longer only a product of linguistic and meaning-making processes. It results also from specific practices (including discursive ones).**

This is an analytical shift and an attempt to 'work against the grain of the logocentric conception of social agency – "I think therefore I act"' (Whatmore, 2006: 603). It is associated with the so-called practice turn (see Reckwitz, 2002; Rouse, 2007; Schatzki, Knorr-Cetina, & von Savigny, 2001) and relocates social agency, to practice and performance rather than linguistic meaning-making. Rather than leaving linguistic discourse behind, it reconfigures it as a specific kind of practice with agential capacities. From a pandemic perspective, the establishment of physical and political borders around affected countries, screening of travellers before they are allowed to flee those countries, and the evacuation of health-care workers are some examples of how the identities and categorisations of the actors involved are produced through the practical engagements of health response.

2) **From meaning to affect: Relations between those groups constructed through meaning-making and practices are felt at the affective level, both by individuals and collectively.**

With this shift, efforts are made to relocate individual- and collective-level sense-making to an affective perspective. For Whatmore (2006: 604), 'affect refers to the force of intensive relationality – intensities that are felt but not

personal; visceral but not confined to an individuated body'. As I argued in Chapter 2, a culture of fear in response to risk society is a central element in defining threat (Furedi, 1997; Massumi, 1993; 2005a), but, most importantly, affect is key in articulating the available responses to threat and disease. As I will argue later (see Chapter 6), governmental responses to biological threats and flows of information are directly mediated by the possibility of collective affective responses in the population.

3) **Towards more-than-human modes of enquiry: Social processes are not exclusively human. They are enacted by both humans and nonhumans.**

This point is of especial relevance for what I propose. The third shift assumes that sociomaterial change is not exclusively a human matter. Rather, animals, technological devices, and the environment play a very important role in the social world(s) that we live in and produce. Identity and groups are constructed around what I call more-than-human assemblages. As I argued at the beginning of the chapter, the identities and categories that emerge during pandemics are not a result of human processes. They encompass many other social entities that get identified in terms of threat, vulnerability, and/or expertise. There, I mentioned also that viruses, populations, and science are part of wider assemblages through which actors are identified (as threatening, vulnerable, or expert). Alongside these, technologies, pharmaceutical countermeasures, and even biological samples come to be key determinants in the identification of relevant social actors.

4) **From the politics of identity to the politics of knowledge: There is a shift from merely identifying and naming things to exploring how those things are named, stabilised, and made productive.**

This shift addresses two concerns related to how knowledge is produced. Firstly, expertise is redistributed on account of recognition that a multiplicity of knowledge practices and communities results from the inherent uncertainty that characterises social problems. Secondly, science is reformulated as a truth-making activity that constitutes the phenomena that it studies as 'reliable witnesses'. In other words, we move from naming things to taking an interest in how those things are named. That is, identifying groups as stable categories and labelling the interactions between those groups ceases to be the priority. From expert positions, knowledge-makers still attempt to identify, group, and label, but the interest from a social scientific perspective lies in understanding how it is that certain categories and identities take shape and, more importantly, what makes them more or less open to change. It could go without saying that the groups and categorisations to which I refer in the following chapters are not stable categories; however, it bears repeating that

the constant associations between various social actors turn identities into categories that are always in the making. The actors that feature in pandemics are constantly becoming threatening, vulnerable, and/or expert through their entanglements with other actors. The challenge for health institutions, science, and governments lies in controlling the assemblages that become a threat before they become one.

Looking at identity in light of these four shifts enables us to pursue a more extensive understanding of how processes of identification, categorisation, and boundary-making take place. This approach is clearly relational, but it also provides the basis for an understanding of identification and identities in which these are distributed among humans and nonhumans. In other words, the social actors involved are always identified in accordance with their associations with other human and nonhuman actors. Identity becomes a shared, distributed, and more-than-human matter that is defined through practices, affects, and knowledge-making. It is because of the hybrid and changing nature of these more-than-human associations that I denote them as **assemblages**.

The concept of assemblage is an important one for this thesis, from a methodological (see Chapter 4) and theoretical perspective both. I use the concept in the sense developed by Deleuze and Felix Guattari (2006)[20]. The concept helps me describe the hybrid and processual character that is integral to identification and categorisation processes. In other words, in the context of the assemblage, identities are always categories in the making that shift and change in line with the hybrid associations they take part in. In the association of different elements (e.g., a virus and an animal), both elements turn into something else (e.g., an infected animal and a spreading virus or, rather, a

[20] It is important to note that the term 'assemblage' results from an often misleading English translation of Deleuze and Guattari's work (Phillips, 2006: 108). These authors used the French notion of *agencement* when talking about assemblages, not the French word 'assemblage', which would more usually correspond to the English word of the same spelling. Although the two French words are related in a sense, John Phillips warns us that by not considering the translation issues, we might lose some sight of the senses and particularities of the Deleuzian notion of assemblage:

> *Agencement* is a common French word with the senses of either 'arrangement,' 'fitting' or 'fixing' and is used in French in as many contexts as those words are used in English: one would speak of the arrangement of parts of a body or machine; one might talk of fixing (fitting or affixing) two or more parts together; and one might use the term for both the act of fixing and the arrangement itself, as in the fixtures and fittings of a building or shop, or the parts of a machine.

In other words, the Deleuzian term, as I use it here, is not only about grouping or mixing but to do with connection, resignification, and becomings.

vector). The assemblages I refer to are often more complex than those formed by two actors, but the logics are of a similar sort.

The concept of assemblage also has certain implications in terms of agency. In this connection, I always consider agency to be distributed and not intrinsic to any actor. Following on from the example above of the virus, the animal, and the vector, I see the ability to infect as being a result of the associations that the virus and the animal are involved in. In a similarity to Latour's (1999) notion of nonhuman agency, the involvement of several actors in a course of action alters and modifies any original course of action that might have existed. In conclusion, referring to more-than-human hybrids in terms of assemblages entails three consequences that are valuable for my understanding of changing identities and categories: a focus on processes of becoming, its utility for describing hybrid, more-than-human formations, and its emphasis on a distributed understanding of agency[21].

3.1.3 INTERSECTIONALLY DEFINED IDENTITIES

The examples I have just presented of health identities being defined through the connections between human and nonhuman actors also illustrate how multiple identities and categories are, in fact, defined in connection with each other. Accordingly, the agency of the actors, how they are categorised, and the way they are governed by pandemic preparedness and response mechanisms are actually results of the individual categories and identities in which the actors participate.

This way of understanding the definition of multiple and shared identities is closely linked with notions of intersectionality. Research on intersectionality had its origins in the context of feminist studies, where it has been especially fruitful. As a theoretical frame, it establishes that one cannot understand experiences of identification by looking at experiences and identities of race, ethnicity, gender, sexuality, class, or nationality in isolation from each other. The entwined character of these identities hence demands challenging of traditional identity boundaries (Crenshaw, 1991). According to Avtar Brah and

[21] The concept of assemblage might resonate with two similar concepts often used in STS: actor-networks and apparatuses. While I have explained the value of the assemblage concept for my work, I find it important to clarify how also these two tie in with my project. On one hand, although the actor-network is especially useful for conceptualising hybridity, some shortcomings remain with regard to depicting the changing nature of becomings, which I consider vital for understanding the way more-than-human identities work in my analysis. On the other hand, I understand an apparatus as being shaped in specific agential settings – i.e., through what Karen Barad (2007: 114) has called 'agencies of observation'. Accordingly, I use the word 'apparatus' to describe specific more-than-human formations that are designed by certain organisms with certain purposes. The concept of apparatus becomes key for describing the governmental and knowledge-making mechanisms of pandemic preparedness, which are central to shaping the more-than-human identities of threat, vulnerability, and expertise (see Chapter 5).

Ann Phoenix (2004: 76), intersectionality signifies 'the complex, irreducible, varied, and variable effects which ensue when multiple axes of differentiation – economic, political, cultural, psychic, subjective and experiential – intersect in historically specific contexts'. The understanding of identities as interlocked is what makes this frame so useful for thinking about categories of threat, vulnerability, and expertise as enacted in the field of pandemic preparedness and response: the identification and categorisation of specific actors in those terms is an output of interplay between those categories and the diverse national, spatial, gender, and class identities associated with those actors.

Table 5: *Example of intersectionally defined categories and identities in pandemic contexts*

Assemblage	Example
Threatening	Urban and rural areas are categorised as more or as less threatening in line with, respectively, their facilitating or hindering of the spread of disease. Accordingly, communities and populations living there are identified as more or less threatening on the basis of how they engage with urban and rural landscapes. When the preparedness apparatus organises governance in relation to rural and urban population distributions, threat is defined in association with spatial identities conditioned by how humans, animals, viruses, and landscape interact.
Vulnerable	Gendered and family-related care practices in certain communities (e.g., female members of the family caring for the sick) contribute to constructing gender, family, and threat as intersecting categories that determine the actors' level of vulnerability at the crossroads of those identities/categories.
Expert	Qualified and trained local workers in countries affected by public-health emergencies of international concern may be unable to be hired by or work in expert organisations because evacuation visas (and hence safe work conditions) cannot be guaranteed, in case they are infected. Thus, being able to identify as an expert researcher becomes contingent on having the 'right' nationality. This conditions local researchers but also the building of expert communities in 'threatening' regions.

Although intersectionality has for a long time been framed in terms of more traditionally identity-related categories, more recent works have started to formulate it in more-than-human and post-structuralist terms. Especially

relevant is the work of Mel Y. Chen (2011; 2012; Hayward & Chen, 2015), who addresses the fragile division between the animate and the inanimate. Through the study of varied human and nonhuman entanglements, she considers how the intersectionality of identity conditions and articulates the way in which the inanimate becomes agentic through social entanglements. More specifically, Chen's (2011) analysis of how the use of toxic materials in children's toys racialises both human and nonhuman elements illustrates nicely how an intersectional perspective might be useful in understanding more-than-human entanglements. Firstly, lead as a toxic material is racialised by means of the Chinese nationality of the toy manufacturer. Secondly, the threat becomes relevant only when normative conceptions of health associated with white children enter in. While the effects of lead-based paint on black children living on old council estates has gone unaddressed for decades in the US, lead toxicity affecting a new (predominantly white) population and rooted in an externally located threat (the Chinese manufacturer) makes that toxicity into a national health issue.

Dynamics similar to those illustrated by Chen emerge in pandemic threats. In these, human and nonhuman entanglements become defined in terms of threat vs. vulnerability, and also social identities. Table 5 presents three examples of identities intersectionally defined as parts of wider threatening, vulnerable, and expert assemblages. These examples are expanded upon in the analysis chapters that follow; however, discussing them here should help to clarify the value of the intersectionality lens for understanding how pandemic identities are socially articulated.

These examples show some ways in which the categories and identities that play a role and are at stake during pandemic processes are often interlocked. The purpose of bringing up these examples here is to elucidate the utility of a more-than-human approach to understanding processes of identification and categorisation (along with the crystallisation of these into stable and productive identities and categories). The examples are presented in a rather simplistic way at this point in the work but will be refined and substantiated as I revisit them in later chapters.

Notions of intersectionality have been largely absent from the study of boundaries and categorisations in science studies, and I believe there is value in addressing the gap by incorporating these ideas. In the following section, I turn to what has been done already, presenting some of the main characteristics of the study of boundaries and categorisations in STS. Some of the processes dealt with are very much present in the way certain social actors are identified during pandemics, and seeing them in more-than-human and intersectional terms enables us to contribute a new perspective on the way pandemic processes are constructed on institutional and technoscientific dimensions.

3.2 BOUNDARIES IN THE MAKING

Boundaries and categorisations have long been among the most central topics in the social sciences. This line of research has often focused on the way scientific disciplines and specific areas of expertise are delimited or on the lines between categories with dichotomous relations as frequently being blurrier than we tend to think. The line drawn between lay and expert (Star & Griesemer, 1989), between healthy and pathological (Canguilhem, 1991), between nature and culture (Haraway, 2003) and in binary understandings of gender (Butler, 1990) are some examples. These boundaries are illustrative of some of the dynamics I describe in this thesis, in which much has to do with grouping elements into categories by appealing to features they display. In terms of governance and social interaction, this makes it possible to treat them, describe them, or govern them in particular ways.

Although studies of boundaries, classifications, and categorisations have mostly overlooked the intersecting nature of categories, the mechanisms they do describe have relevance for grasping how pandemic preparedness and response entities define and try to govern the various distinctions between the threatening, the vulnerable, and the expert. Indeed, much of the work carried out to face pandemics can be understood in terms of a topic that has long been of interest for the social sciences: separating the healthy from the diseased (Hinchliffe, Allen, Lavau, Bingham, & Carter, 2013). In a more-than-human conception of such separation, both the healthy and the diseased are defined not in terms of specific populations but with regard to the assemblages that human and nonhuman social actors form with their surroundings. In this section, I argue that these processes of categorisation are relevant to understanding how various elements relevant for the characterisation of pandemic threats themselves get categorised, in line with a more-than-human approach to identification and categorisation.

3.2.1 CATEGORISATIONS AND EXPERTISE

The literature on boundary-making and categorisations has been especially productive in relation to the work of experts. Professionals' classification systems, discipline boundaries, and lay/expert divides are important elements in some of the processes that I present below, with the relevance being that similar ones emerge in pandemic contexts. For example, within the previous section's examples of defining rural or urban areas, identifying gendered practices, and selecting health-care workers with an evacuation-friendly passport, one can see several divisions, categorisations, and identifications being made in relation to spatial boundaries, gendered practices, nationality, and expertise. In facing pandemics, those categorisations take on an added

layer of relevance as they intersectionally condition the belonging to threatening, vulnerable, and expert assemblages. In other words, the various categories and identities in which actors participate are key to determining the role they play in the development of the pandemic – and, therefore, in the governmental response that those identifications are mobilised to justify.

It is in this context that the tools offered by existing literature on boundary-making and classifications become useful for my work. Probably one of the most important works ever written on the constant use of categories and classifications is Geoffrey C. Bowker and Susan Leigh Star's book *Sorting Things Out* (2000), in which they provide a comprehensive elaboration, full of empirical examples, on categories and classifications as an essential part of social life that has important consequences for how we understand and interact with the world. At base, Bowker and Star's starting point was that categorisations are not givens, boxes that we fill. Instead, they are a result of hard collective work. They do not pre-exist the objects they are used to classify; rather, they are a way to handle those objects in an organised manner. Therefore, categorisations are often liable to change, though they need not experience constant change. When they **are** stable, this state is a result of continuous work to reinforce them and is held in place through reiteration processes[22]. Therefore, they are inherently historically situated: they always belong to their own time and context. Indeed, as Bowker and Star (2000: 287) argue, 'categories are historically situated artifacts and, like all artifacts, are learned as part of membership in communities of practice'.

What makes theorisation about boundary-making relevant for the study of pandemic processes is that there is an identifiable community integrated with the international bodies that works towards certain goals (I presented some of the key actors in Chapter 1, while the way such communities are formed is discussed in more detail in Chapter 6). Becoming part of a community of practice means being able to naturalise a series of categorisations and objects, where I use 'naturalisation' not for the banal sense of an object's or category's **intrinsic** belonging but to signify that, by belonging to the community, the object ends up losing its strangeness; i.e., it becomes a natural object in the context of the community while not a natural object in its own right. Thus, naturalisation strips away categorisations of objects' situated configuration, their historicity, and their context – and this would include their relationship with other categories or identities. It makes the infrastructure that underlies a categorisation system invisible to the members of the community that enfolds the object (Star, 1999). They thereby follow a process by means of which membership leads to naturalisation, which then leads to a certain 'taken-for-grantedness' (Bowker & Star, 2000: 299).

Bowker and Star pointed out that the use we make of categories does not only have an effect on things; actually, those categories 'craft people's

[22] Reiteration processes are especially visible in how gender identities and categorisations are established. This is one of the main arguments in the work of Judith Butler (1993).

identities, aspirations and dignity' (Bowker & Star, 2000: 4). This idea is fundamental to understanding how human and nonhuman assemblages work and how various identities are crafted in terms of the categories offered by governmental apparatuses. As I have been arguing throughout the chapter, human and nonhuman shared identities and categories often intersect. The process involved is made visible in the work of Bowker and Star through two empirical examples. Firstly, racial categorisation extends beyond racial identity, into relationships with issues such as agency, aspirations, sense of self, and stigmatisation. A second example the authors offer is the categorisation of disease. By analysing the International Classification of Disease (ICD), Bowker and Star showed how medical categorisation can influence people's lives by dint of helping to construct the identity of a diseased person. In this thesis, I take those examples further. As intersectionality scholars would put it (Bredström, 2006), health identities are tied to other identities, linked to gender, profession, nationality, and education. Hence, the categorisations of race and disease that Bowker and Star discussed cannot be understood as isolated categorisation processes. Rather, I argue, they are intersectional.

For a productive understanding of categories that might aid in applying intersectional approaches to theory and analysis surrounding health pandemic identities, I wish to step back and consider some of the underlying mechanisms of boundary-making processes in greater depth. Prior to the publication of *Sorting Things Out*, there were several important contributions that addressed how boundaries between categories are established and maintained, especially in the study of science and expertise (Gieryn, 1983; Jasanoff, 1987; Shackley & Wynne, 1996; Star & Griesemer, 1989). That research focused on two main processes in the establishment, regulation, and redrawing of boundaries: the role of boundary objects and the carrying out of boundary work.

Both concepts are especially useful for describing what sorts of categories belong to the preparedness systems and which do not. In other words, when practices, identities, and behaviours do not fit the logics of pandemic preparedness and response, they become othered; secondary; marginalised; or, most importantly, threatening. As I explain these two boundary-related concepts, I attempt to bring in some examples for illustration of how they can be useful in the context of pandemics.

3.2.1.1 Boundary objects

The notion of boundary object (Star & Griesemer, 1989) makes reference to elements that are able to inhabit several areas of expertise or disciplines. They can inhabit multiple social worlds and be meaningful in all of them. This is

because they are targets of interest from within the various communities – they not only inhabit several social worlds but actually satisfy the requirements, categorisations, and standards of **each** of them. To do this, they have to be plastic enough to adapt to local needs but robust enough to maintain their identity across those different sites.

The relevance of the concept of boundary object for biosecurity has been addressed by Samimian-Darash, Hadas Henner-Shapira, and Tal Daviko (2016), who described biosecurity itself as a boundary object. For these authors, biosecurity can be understood thus because it plays different roles in different social worlds but still is able to preserve some sort of unitary identity. In their article, the type of boundary object that biosecurity manifests itself as depends on which of two national contexts is analysed: the US or Israel. While biosecurity works as a nexus between science and society in the US, in Israel it sits between science and the state. In both cases, it helps to overcome a gap between two social worlds.

This concept is especially useful in thinking about pandemic processes because when a device, practice, identity, or category does not travel easily between contexts, the 'rough patches' point to where the limits of the expert pandemic assemblages lie. Types of knowledge that work with different logics – e.g., from the social sciences or traditional knowledge – are clear examples. Where they do not integrate readily into pandemic-related normative knowledge, we can detect the lack of devices suitable for turning the relevant objects of knowledge into elements that can traverse gaps between domains of knowledge. For example, knowledge developed through ethnographic research into local cultures, whatever its possible relevance for drafting of public-health initiatives, is hardly ever incorporated into public-health response protocols, because of the clash of its rationality frames against public-health, epidemiological, and biomedical logics.

3.2.1.2 Boundary work

Boundary work, meanwhile, refers to stabilisation and strengthening of certain boundaries instead of their permeability. This has been seen as a common response among scientists who, when encountering challenges to their disciplinary and scientific expertise, try to demarcate the area in which they are competent (Gieryn, 1983). I use this idea to think about how expert agents define pandemic expertise – both institutional and technoscientific – as having a relevant role with regard to pandemics: of identifying and countering existing biological threats and protecting threatened societies. This, at the same time, delimits what collectives are 'threatening' and what collectives seem in need of being protected.

The concept is rooted in the idea that areas of expertise, among them science in general, do not exist by themselves but are enacted by the scientists through everyday practice. Also, there are differences in the ways in which boundaries are constructed and defended. For example, the types of

boundaries by which certain activities are constructed and promoted as scientific vary with the comparison, depending on whether the contrast is against religion, mechanics (Gieryn, 1983), or policy (Jasanoff, 1987). Such examples are illustrative of how an area of expertise is defined in terms of interiority and exteriority. In other words, having an outgroup community that is depicted as non-expert allows claiming of expertise for one's ingroup community. This is a key factor in defining the boundaries of threatening, vulnerable, and expert assemblages. Boundary work has been argued to be especially useful in the face of uncertainty – for instance, in cases wherein policy or semi-public arenas accord agents of scientific expertise little or no ability to issue authoritative statements (Shackley & Wynne, 1996).

Not all attempts at constructing expertise and authority go unchallenged – boundary work can be hard, and not everybody in a given community has the same ability to do it. As Pia Vuolanto (2015) has pointed out, there are always issues of power involved in boundary-work processes. Vuolanto argues that actors have varying degrees of influence on a specific boundary-work situation, conditioned via their level of symbolic capital. This discussion points to existing hierarchies within a given field, alongside differences in understandings of disciplinary identity – the various ways of understanding who belongs and who does not. In consequence, actors in less powerful positions might have more difficulties in making their voices heard and therefore be unable to claim authority over certain topics.

In the context of pandemics, boundary work becomes visible when practices or knowledges that are not normative are highlighted as threatening. In the process of pointing these out as threatening, organisms behind them too are identified as potentially threatening. Researchers who engage in unsafe laboratory practices are one clear example. Establishing guidelines for laboratory biosafety and biosecurity strengthens the boundary between what is safe and what is threatening while, at the same time, those who do not practice science in such normative ways can become assigned to threatening assemblages.

3.2.2 THE FRAGILITY AND ROBUSTNESS OF CLASSIFICATIONS

Boundary objects and boundary work are two sides of the same coin as they simultaneously test boundaries' robustness, both signalling their weaknesses and fortifying them. That is, the processes take place around lines of interiority and exteriority. For example, boundary objects reveal areas of overlap between social worlds; however, by being able to exist in each of those worlds, they also allow those worlds to remain separated. Boundary work, on the other hand, consists in constant efforts to reinforce the boundaries that separate communities, disciplines, or areas of expertise from one another. At the same

time, the documentation of boundary-work devices such as those explained in the previous section points to the fragility of the boundaries.

The passion for classification that is attested to by the literature I review is something that nicely describes many of the biopreparedness processes I have been investigating. During my research, I detected an active quest to identify threatening elements, name them, characterise them, and classify them. Institutions classify pandemics in accordance with an alert-phase system. Background checks are run on scientists who are going to work with dangerous viruses. In turn, virus samples that are research subjects get assigned one of four levels of risk, and laboratories are classified accordingly, for their capacity to handle individual types of viruses safely. People who want to travel during an outbreak need to prove that they can be classified as healthy, and, again, their nationality will play a very relevant role in their right to be evacuated from an outbreak area. While this disparate list of examples might make the concept of boundary vague at times in its abstract form, they are also ways in which such vagueness becomes visible and concrete.

Indeed, I use the concept of boundary to refer to a wide variety of divisions that include, among others, the political, the territorial, or the ontological. While I do not try to argue those different divisions work with exactly the same logics, the concept of boundary and the mechanisms that underlie it are still useful in order to describe the lines that separate those categories. As categories belonging to such a varied range become interwoven and, sometimes, even interlocked, they start sharing the lines – the boundaries – that separate them. **Thus, although defining the concept of boundary in such a wide manner might give an impression of vagueness, it is important to remember that such vagueness goes away in the specific examples that I discuss throughout the thesis.**

The way boundaries are depicted throughout the thesis relates to a central question posed by pandemic preparedness and response mechanisms: is this helping to fight the threat, or is this helping to spread it? That is where the identification and the boundary-making processes emerge. No social actors or assemblages can remain neutral. The expert assemblage works continuously to ascertain whether those actors are threatening or vulnerable. Most importantly, all those categorisations that play a key role in the way various assemblages are identified and governed during biological emergencies are not neutrally decided upon and applied. Rather, they are always output of practical politics. In other words, 'whatever appears as universal or indeed standard, is the result of negotiations, organization processes and conflict' (Bowker & Star, 2000: 44).

While it is vital to study the existing categories applied in preparedness systems if we are to describe how health and research institutions understand the world they construct and interact with, limiting that consideration to categorisation systems could keep us from paying attention to othered categories and identities. Quite often, **categories and identities not contemplated by the system play a role in that system as they**

intersect with the categories the system offers. **The categories and identities not explicit in the system might go unacknowledged because of the way they challenge existing boundaries. For this reason, it is important to look at what is outside the system, what is not contemplated or perhaps is purposefully marginalised.** Those unheard, ignored, and marginalised identities are vital to how the categories/identities offered by the system are enacted. I will now explore these ideas by turning to discussions about notions of interiority and exteriority.

3.3 THE BORDERS OF PROTECTION

In the process of identifying the various social actors involved in pandemic threats, boundaries and identities often coalesce around threat/protection narratives. The threatening, vulnerable, and expert assemblages that I have been referring to are continuously articulated around that boundary. Viruses, together with bioterrorists and an array of other actors – described in more detail in coming chapters – represent a hazard to a society that needs protection and that makes use of its knowledge and expertise to protect itself.

Under this narrative, all social actors should comply with good public-health practices. Any not doing so thereby represent a threat to the biological security of the society. Therefore, the preparedness system features attempts to categorise social actors in accordance with the level of threat they pose (as threatening assemblages), their need for protection (as vulnerable assemblages), and their contribution to keeping society safe and secure (as expert assemblages). Even if the categorisation often fails or there exist stumbling blocks to reaching this goal, it is one of the ultimate objectives for the preparedness apparatus, for establishment of robust boundaries and clear divisions. When, however, we talk in terms of globality, it becomes difficult to compass clearly what groups or collectivities are intended to be protected. Does the goal of global health extend to the entire human population? Is the health of even those representing a threat supposed to be protected? What about animals? Does that goal cover only those actors that follow international rules? Who (or what) deserves protection, and who (or what) is able to provide it?

The boundaries are far from clear-cut. For example, viruses are not always threatening. They can be enrolled as secured biological samples that aid in developing research that can inform expert assemblages and hence protect vulnerable actors. This non-essentialist view of the social actors involved in pandemic processes nuances the boundary between threat and protection. This boundary that marks exteriority is organised rather more around the controlled vs. the uncontrolled. The uncontrolled remains on the threatening

side of the divide, together with the risky and other elements that do not comply with the norms of global health. Among the main objectives of pandemic preparedness and response is to bring viruses, researchers with nefarious purposes, farmers who do not work biosecurely, and infected humans and animals under control, to make them part of a society that needs protection or that can help to protect.

Discussion of what we define as internal or external to 'society' is not at all new to the social sciences, and globalisation processes have given it added fuel. I begin this section with some work that sheds light on what a global society – or a globally connected society – might mean in terms of pandemic threats. To do this, I return to the work of Beck, whose conceptualisation of risk society helped me lay out the background behind the reigning logics of preparedness (see Chapter 2). Here, I proceed from Beck's work for discussing the global connections that characterise contemporary international relations. In the wake of the success of the concept of risk society, Beck dedicated considerable effort to developing a sociological theory that could account for those connections. To engage critically with his sociological approach, which he named 'cosmopolitan realism' (Beck, 2004; 2006), and with the cosmopolitan vision, I draw upon Latour's (2004) critique of the concept, which was published in an article with the pithy title 'Whose Cosmos, Which Cosmopolitics?'. I continue my formulation of interiority and exteriority by attempting to make these notions productive for the study of pandemic processes. Thus, before moving on to the concluding section of this chapter, I try to articulate how these debates can be understood as discussions of what should or can be included in and excluded from the idea of society – or, for purposes of the thesis, what should be protected and what should be considered a threat. I do not presume to settle this matter; rather, my target is to establish a foundation for understanding how such division is constantly being re-enacted in the way governance is thought about, discussed, and practised in relation to pandemic threats. In other words, I wish to point out how such boundaries are always in the making.

3.3.1 BECK'S COSMOPOLITAN REALISM AND LATOUR'S CRITIQUE

The cosmopolitan realism presented by Beck was a way to claim some universality in a world of otherness. That is, Beck sought to rely on the interconnectedness that new information technologies, together with other globalising devices, afford for describing a world whose happenings affect us all. For Beck, the consequences of interconnectedness take the form of a cosmopolitan society. This cosmopolitan society and the cosmopolitan outlook can be summarised, according to Beck (2006), via five principles:

1. An **experience of crisis in the world society**, which describes an awareness of interdependence, a common global fate connected

to global risks and crises that cross boundaries such as internal/external, us/them, and national/international.
2. A **recognition of difference**, which results in (limited) curiosity in the cosmopolitan outlook with regard to differences of culture and identity and, therefore, connects to a 'cosmopolitan conflict character' – i.e., a clash in the face of emerging awareness of simultaneous sameness and otherness.
3. A **cosmopolitan empathy** that allows for the virtual interchangeability of situations – both opportunities and threats – across different parts of the world.
4. The **impossibility of living in a world society free of borders**, which leads to redrawing and rebuilding of old boundaries.
5. The **melange principle**, whereby all aspects of life (local, national, ethnic, religious, and cosmopolitan cultures) are connected to each other; i.e., provincialism and cosmopolitanism are interdependent.

Beck's points describe accurately what has come to be defined as global society, whereby the world is seen as an interconnected whole. However, in his cosmopolitan outlook, Beck often was unable to recognise otherness. Claiming that the world is a cosmopolitanised space where interdimensional connections are made between local and global spaces and where there are connections between states and cultures that were thought to be separated does not make the world one big cosmopolitan society. Even if Beck truly felt that decisions made in global organisations such as the UN Security Council (one of the examples he employs) seem to speak for the whole of humanity (Beck, 2006), that does not bring a unitary feeling. We do live in a cosmopolitan world, but it is not equally cosmopolitan for all. Hence, although Beck formulated cosmopolitanism as meaning a recognition of otherness in which differences are neither arranged hierarchically nor dissolved into universality, just accepted, cosmopolitanism is still an idea produced from a very specific somewhere.

As Latour (2004) incisively indicated, that somewhere is the Western academic environment. A cosmopolitan vision cannot be a vision out of nowhere or from everywhere, and in its claim to explain otherness, cosmopolitan realism ends up othering non-cosmopolitan worldviews. Beck's perspective can be considered, as Latour (2004: 453) has put it, 'ethnocentric because his cosmopolitanism is a gentler case of European philosophical internationalism', an export of a cosmopolitan vision that is based on a Western worldview. In cosmopolitanism, the cosmos is seen as a reality that is simply there; while it exists in interconnection, it still is a natural 'reality to which we [cosmopolitans], through science, have privileged access' (Latour, 2004: 458). Cosmopolitan ideas belong to a Western native fundamentalism

that, for Latour, was not submitted for discussion in Beck's vision of cosmopolitanism and hence cast the validity of cosmopolitanism as a new project for globalisation very much in doubt. For Latour, it is vitally important to take one's own vision as a fabricated one, at least as fabricated as other visions. This provides, in Latour's opinion, an opportunity to build stronger ground on which those visions can meet and coexist.

For our purposes, the engagement goes beyond one of philosophical academicism, though. Latour and Beck's discussion connects with a very basic question that is central to my thesis: who and what forms the global in global health? If it is a cosmopolitan health, the global can be taken as an interconnected whole formed by numerous localities, nationalities, ethnicities, and cultures that, irrespective of – and partially because of – their difference, are in need of a unified approach to health. If we employ Latour's reasoning, this would involve a cosmopolitan whole very much powered from the Western domination of international politics. In my work, I understand the global health project as a sort of flag-bearer for cosmopolitanism. Global health represents a cosmopolitan health that is made from specific viewpoints, with Western politics and scientific truths being at the centre of the proposal. This type of global health cannot legitimately govern for the whole global society, but it does so for a specific part of it.

Indeed, these features of global health are well summarised by the 'One Health Initiative'[23]. This initiative suggests a model of global health that defines itself as a 'worldwide strategy for expanding interdisciplinary collaborations and communications in all aspects of health care for humans, animals and the environment'. The initiative is aimed at carrying medical knowledge-making across the globe and throughout the disciplines of environmental health, ecology, veterinary medicine, public health, human medicine, molecular biology, microbiology, and health economics. Though a vast project with global ambitions, the initiative is set and defined by mostly American disciplinary associations. The One Health Initiative, as Hinchliffe (2015) has argued, reduces health to single truths that have sprung from Western triumphalism. This consequently provokes 'a tendency to prioritise certain understandings or enactments of disease' (Hinchliffe, 2015: 34) while a worldview that fuels global health is omitted. In other words, what takes the name 'global health' remains oblivious to its own condition as knowledge and power apparatus that stems from, is conceived of from, and is enforced from specific positions of power. While global health knowledge is distributed, on many occasions knowledge becomes specifically situated, although any hint at

[23] A more detailed description of the initiative can be found on the Web site http://www.onehealthinitiative.com/. For a series of critical readings of the motto 'One World, One Health', see the *Social Science & Medicine* special issue (Vol. 129) titled 'One World One Health? Social Science Engagements with the One Medicine Agenda' (2015).

its situatedness is obliterated[24]. Therefore, the question becomes this: if global health does not govern everyone – if the society that it protects is not truly a global one – what (or who) is included in that society, and what (or who) is not? In simple terms, what is the society that needs to be saved from pandemic threats?

3.3.2 BEING INSIDE/OUTSIDE THE SECURE SOCIETY

It is in efforts to answer the questions I posed above that academic theory and earlier work on identification and categorisation processes become relevant. Indeed, much of the workings of pandemic preparedness is articulated around the interiority/exteriority divide. **The interconnectedness and transnationalism that Beck talked about remain but in different terms. These are fruit not of cosmopolitan connections in how health is enacted in different localities but, rather, of compliance with specific health security norms established in global health forums – constituted from specific places of power – through the exercise of scientific and political authority.** In a more-than-human understanding of a secure society, belonging does not stem from classic dichotomies such as human/nonhuman or native/foreigner; instead, it is a result of knowledge-making and governance processes that promote specific conceptualisations of threat and protection. Falling in line with particular scientific discourses and good governance practices is now the passport that grants the label 'biosecure' to countries, institutions, citizens, health-care professionals, farmers, and any other actors involved in pandemic processes; that is, granting of this label confers the status of insider.

Hence, as Latour (1999) has suggested, (biosecure) society is delimited through the associations, connections, and engagements in which various actors participate. In order to comprehend these associations in their wider sense, Latour has suggested the use of the term 'collectivity' as a way to avoid the baggage of the word 'society' and the nature/culture divide that it reiterates. Latour's argument is valid to a certain extent: collectivity nicely conveys the sense of a more-than-human society, placing the focus on social

[24] The concept of situated knowledge comes from the work of Donna Haraway (1988). For Haraway, all knowledges are necessarily situated in that no knowledge is objective or global. Rather, all knowledge is equally objective, because all knowledge emerges in situated settings. In portraying global health initiatives as universal initiatives, there is a tendency to obscure the situatedness of such initiatives, which often have their roots in Western political and health agendas.

assemblages that are defined in a distributed manner[25]. This is important because often when we talk about protection of a 'society', that society is conceptualised in a manner that includes only the human. As Whatmore (2002: 161) has said of human conceptions of society, 'everything but the universal human subject has been expunged', leaving no space for otherness, whether human or not. Hybrid and more-than-human assemblages offer a conceptualisation of society whereby societies, or collectivities, are understood in terms of hybrid formations – i.e., in terms of the associations that shape particular assemblages. This does not mean that everything gets included or that everything is part of the society that we are looking at preserving. Such divisions merely are not based on human vs. nonhuman distinctions. Instead, they rely on certain health-related identities to establish boundaries for protection and expertise.

As I have already mentioned, in the case of pandemic preparedness and response, it is the boundary between the governmentally controlled and the uncontrolled that makes the protection boundary visible. From a Foucauldian perspective, it is the life that escapes power relationships that aids in establishing a certain exteriority (Pyyhtinen & Tamminen, 2011)[26]. In the case of pandemics, those life forms, as part of more-than-human assemblages, that escape the institutional and technoscientific control mechanisms are the ones that constitute the outside – the threatening. And it is this relationship of

[25] I do not advocate utterly abandoning the word 'society', a task that would be nearly impossible in any case. Since the term retains currency and is used very extensively, it would make little sense to outright hide a word that is so very performative. In connection with pandemic threats, the use of the concept performs relations of interiority and exteriority related to groups, knowledge, and governance. In this thesis, I rely on both terms, with the selection depending on the voices and interlocutors I engage with. It is worth remembering that, whether I talk about society or collectivity, the term is defined in terms of interiority and exteriority. In other words, there is no such thing as a global, universal society or collectivity. Rather, defining a society or collectivity as vulnerable or in need of protection is to delineate its outer boundaries (and thereby delineate its complement: the outside that apparently is threatening it).

[26] Expanding on Foucault's conception of exteriority, Deleuze (1988: 43) describes three types of outside by drawing from Foucauldian notions of exteriority. First is **the outside**, which 'exists as an unformed element of forces'. In this sense, the outside is external to the principles and rules of that which is institutionalised. **The exterior** is an 'area of concrete assemblages, where relations between forces are being realized'; i.e., it is a recognisable outside. Finally, **forms of exteriority** result from sharing of those exterior assemblages between interior and exterior formations. Deleuze's depiction does not offer full clarification, as these delimitations seem to paint categories that overlap with each other. In other words, realisation and actualisation of certain assemblages can occur only when these are shared between the interior and the exterior. Indeed, for Foucault, power is total in the sense that it is present in all human relations. However, life is always able to escape it, at least partially: it cannot be completely integrated into control apparatuses. The will to incorporate it into power relations is a consequence of its exteriority (Pyyhtinen & Tamminen, 2011).

exteriority that configures the identity and categories ascribed to those actors that lie beyond governmental control.

The reification of these divisions is an ongoing process in pandemic governance. When we speak of pandemic threats, inside/outside quite often appears as **a categorisation process that needs to be made productive for global health policy-making**. Governance of pandemic threats is a much easier task when humans, animals, viruses, and other relevant social actors are classed into clear groups with clear boundaries. This attempt is not always successful, of course, but it still represents one of the main objectives of global health: to identify and organise the relevant assemblages, the relevant areas of social interaction, such that those actors that are part of the threatening assemblage can become either vulnerable or expert or, at the very least, become known and controlled threats. These boundaries and identities, far from being intrinsic to each actor subject to categorisation, are results of co-constructed narratives and intersectionally determined processes of categorisation. Therefore, **the outside with regard to pandemic threats is not an outside configured by the unknown but an outside formed by the uncontrolled, the non-scientific, and all those elements that do not comply with the norms of one global health**. This is a consequence of identification processes that, through social interaction, allow the various elements to be categorised (often ambivalently) in terms of threat and vulnerability by expert authorities.

3.4 THE PANDEMIC BOUNDARIES

The spaces of exteriority, the external threats, are akin to rural areas where some diseases roam in relative freedom, concerning mostly the local population until they reach a city, cross the border that separates the local from the global, and enter the interconnected world. It is only then that they become a PHEIC that turns them into a global threat. I am now talking about Ebola, a disease that was catalogued for decades but not really addressed in terms of public health or knowledge-making until it reached the capitals of Sierra Leone, Liberia, and Guinea. Similarly, other diseases, animals, populations, and knowledge-makers – together with their own identities – remain beyond the realm of global health until the global health enterprise is challenged. Only then do those local objects and identities clearly need to be categorised in global health terms.

Thus, from a pandemic perspective, the collectivities that must be protected extend to those social actors that are in control (i.e., the expert assemblage) and those that could be affected by threatening assemblages (i.e.,

the vulnerable assemblage)[27]. Outside are social actors and collectives that need to be controlled – external threats of disease and disruption. Indeed, the possibility of disruption described by Massumi (2005b) resides in the possibility of an external element infiltrating society, an outsider making its way inside the society. In a culture of fear and in risk society, the infiltration has already occurred, in that risk and fear occupy internal spaces, thereby blurring the boundaries between society and the threat to it. They are analogous to terrorists in the new age of the war on terrorism, living within the society that they aim to threaten (Samimian-Darash & Stalcup, 2017). This does not, however, dramatically change the objective of pandemic governance: to control or disable exterior threats, including those that have already made their way inside. In fact, emphasis is especially on those that have infiltrated the society.

Therefore, there is a new question on the table: what is already under control, and what is not? Several questions follow from this one: How can we identify that which is not? Can the global health apparatus keep protecting the whole world if part of it is threatening? Finally, is the setting of a global health agenda connected to everybody's interests? I think this chapter has presented some of the tools needed to address these questions.

The first tool is a more-than-human understanding of identification. This understanding of identity serves as a tool for talking about threat and protection in terms of both the human and the nonhuman. These assemblages are shaped in social interaction, but, more importantly, the approach understands identities and categorisations as intersectionally defined. The second tool provides modes for understanding both human and nonhuman categorisations: theories pertaining to boundaries aid in understanding how the lines that divide among threatening, vulnerable, and expert assemblages are established, strengthened, and conceptualised. Finally, the third tool includes the formulation of a situated globality in which otherness and notions of othered communities are not conceived of in terms of interiority and exteriority. In other words, the tool reminds us that global health processes affect the whole world while its diverse parts are affected differently.

In this chapter, while discussing some of the concepts and devices for my analysis, I have hinted at some of my analytical ideas also. This was hard to avoid. While many of those ideas are worked with later in the thesis also, one of them probably stands out quite clearly already because of its centrality and its prominence throughout the chapter. I am referring to the delineation of

[27] As Henry Rothstein, Michael Huber, and George Gaskell (2006) have argued, theorisation about risk and threats has often overlooked the distinction between societal and institutional risks. In their study, they make this difference explicit by associating societal risks with threats posed to society and its environment while institutional risks are considered to affect the institutions and regulatory frameworks that help to counter those societal risks. This division, while not so extensive in the way threats and risk are conceptualised in pandemic preparedness, is crucial for understanding the identification and categorisation processes that surround the division between the threat and protection dimensions.

various types of assemblages as threatening, vulnerable, or expert. I believe that the idea of threatening assemblages has been efficiently characterised throughout the chapter, and in connection with it I have used 'society' to refer both to assemblages that protect through expertise and to assemblages that are vulnerable. While expert assemblages feature a certain knowledge that qualifies them to carry out specific actions against the threat, vulnerable assemblages are characterised as less able to fulfil that role. However, they both need protecting, and both play a role in protecting society from threat. In the same way the boundary between threat and society will be continuously challenged, so the boundary between vulnerable and expert assemblages will be.

Thanks to the tools, we can bear in mind throughout the analysis that none of those assemblages are unitary in their identity. Rather, they need to be understood in terms of their multiplicity. The assemblage that gave identity to the informant I referred to at the beginning of the chapter was made up of many types of human and nonhuman actors: guards, assistants, buildings, cities, and transnational organisations. Those elements do not in themselves protect society in the face of pandemics; it is in bringing them together that my informant and the EU acquired expert and protecting status. Similarly, the threatening otherness that resides outside society is not a homogeneous set of social actors but quite the opposite, an amalgam of difference, post-colonial spaces that resist compliance with the often-totalising understandings of international politics. Yet, through techniques such as the all-hazards approach, a multiple otherness can be taken as a single threat.

As I present the empirical material on the following pages, I describe both small threatening assemblages and big ones, assemblages that are vulnerable and threatening at the same time, and ones that are vulnerable while also expert. In other words, threatening, vulnerable, and expert assemblages are constantly in the making, and so are the actors that are part of them. A hybrid, more-than-human understanding of health implies a wider understanding of social connection that, in consequence, also entails more possibilities for hybrid engagements that may lead social actors to become threat, become vulnerable, or become expert.

4 AN EMPIRICAL ASSEMBLAGE

> *I just submitted a report as part of my internship with the WHO. It included my personal ideas on implementation, interdisciplinary work, and the spread of new knowledges and new approaches. And that makes me ponder: Where does that leave me in relation to pandemic preparedness? What is my position when I stand in the middle of my empirical setting? I have now been attending meetings with my informants, and I have sat in offices with them. I have even started to dress as they do and drink beer with (some of) them. Is that ethnography? My sense of belonging and my identity get blurrier every time I 'go into the field'. Am I part of the academic networks? The policy networks? The public-health networks?*
>
> *Recollections for a Research Diary, February 2017*

It took me some time to recognise that, by gathering empirical material, I had started to build my own network, my personal assemblage: a mix of threatening, vulnerable, and expert actors that could both inform my analysis and star in my upcoming monograph. This, together with the eclectic bag of material I have been amassing over the last few years – articles, reports, policy documents, green papers, interviews, meeting reports, videos, and material from Web sites – has provided me with the information, ideas, examples, and experiences to put together my empirical analysis. The assemblage here, as described in the previous chapter, worked by bringing together a series of disparate actors and objects that, when becoming part of the same network, started growing into something else. In this case, I, along with the rest of my personal network, became part of an empirical assemblage that grew entangled with definitions of threat, vulnerability, and expertise[28]. It was my position straddling the three categories that allowed me to gain a specific understanding of the workings of pandemic preparedness and response. But doing this in a thorough manner required some well-considered steps for drawing together the relevant policies, strategies, analysis, and accounts that

[28] With the chapters' opening excerpts, I intend to show my entanglements with the various threatening, vulnerable, and expert assemblages directly. In each of them, my identity as a researcher and as a human is resignified in light of the relations I engage in. Chapter 1, for example, shows me becoming vulnerable; with Chapter 2, the story starts to take me toward becoming a researcher; and I become a threat in Chapter 3 as I approach sensitive information and am identified (by both self and others) as an outsider. In this chapter's opening excerpt, in turn, I reflect on the process of becoming an expert. Similar becomings are echoed with illustrations in the following chapters. Most importantly for purposes of my overall 'story', I argue that these becomings are an essential part of my research and that the meta-narrative they offer is important insight into my conclusions about pandemic processes.

describe the context of global health emergencies. In this chapter, I delve into those necessary steps.

The chapter is devoted to describing the methodological aspects of my study and is divided into five sections accordingly. In the first, I describe multi-sited ethnography and the more digital and globally inclined version assemblage ethnography (Youdell, 2015; Youdell & McGimpsey, 2015). Assemblage ethnography is especially useful because it shifts the focus from studying policy to studying the various assemblages that allow policies to emerge. In the second section, I step still closer to my work, to describe the digital and physical spaces from which I started to engage with the global health community. The starting points of my research lay in the policy assemblages that surrounded me: the WHO, the European Union, and a selection of national contexts (Finland, Spain, and the UK). However, my initial steps would take me to some unexpected territories that contributed to the singular process of building my empirical assemblage. Following that process, the third section leads through how I analysed the body of empirical material gathered and managed its density, always kept centred by my foci on governance, knowledge, and conceptualisations of threat. The work that I describe in that section, in which I used the ATLAS.ti analysis workbench to build an empirically driven coding system, is what I unpack in the following chapters. Finally, I round out this chapter with two final sections to address the more important ethics challenges and methodological reflections connected with my work.

4.1 ASSEMBLAGE ETHNOGRAPHY

Before I could build an informative assemblage that would make my analysis possible, I had to become familiar with the networks of pandemic preparedness and find a way to compile the valuable information, documents, and accounts that would emerge. For the first part of my path to getting to know the networks better, I relied on prior literature, on the work and adventures of like-minded scholars. This helped me to identify the key players, the relevant spaces, and the pertinent organisations that could help me address my chosen areas of focus (see Chapter 2). However, I learnt quite early in my project that not everybody can access all aspects of pandemic preparedness and response. Some scholars have argued that empirical material is elusive (Koro-Ljungberg & MacLure, 2013; E. B. Petersen, 2013), and I found the same: not all access was up to me. The ultimate form of my empirical assemblage was very much influenced by issues of accessibility. To manage the attendant issues, I used specially developed approaches to ethnographic research that would allow me to alter my plans in accordance with the ways in which the pandemic-related network was organised. This, far from becoming a limitation, helped me to

find new connections and new sites for research. This is something that assemblage ethnography in particular allowed me to do: it afforded physically and digitally following global health in the directions pointed by my areas of focus. However, also less recently developed approaches to ethnography informed the way I conducted my research. Mirroring the development of the field in general, I step back to present these essential elements before introducing assemblage ethnography.

Ethnography emerged as an anthropological technique for exploring different cultures. Hence, its roots extend far into the past and are connected to the study of specific cultures that are both socially and spatially defined. This type of ethnography has been heavily focused on the study of otherness in a colonialist sense and the study of the subaltern in contemporary Western society (Marcus, 1995). Recent decades, however, have given rise to multi-sited ethnography as a way to deal with the spatial and temporal diffusion of global phenomena, with George E. Marcus (1995) being one of the main proponents of this perspective. It connects especially well with the way global health initiatives and agreements are developed and implemented. Besides ushering in more globalised ethnography, this methodology has drawn attention towards a number of interdisciplinary, topic-oriented areas of study, such as media, culture, science, technology, and feminist studies. At the same time, the popularisation of ethnography has for some authors been a motive for its devaluation, alongside devaluation of the discipline of anthropology more generally (Ingold, 2014).

It is important to note that multi-sited ethnography does not merely add a comparative structure or a completist perspective atop layers in an existing hierarchy (Marcus, 1995). While such perspectives operate with spatial planes of understanding where conceptual units are comparable homogeneous entities, multi-sited ethnography offers a vantage point from which

> de facto comparative dimensions develop instead as a function of the fractured, discontinuous place of movement and discovery among sites as one maps an object of study and needs to posit logics of relationship, translation and association among these sites. Thus, in multi-sited ethnography, comparison emerges from putting questions to an emergent object of study whose contours, sites, relationships are not known beforehand, but are themselves a contribution of making an account that has different, complexly connected real-world sites of investigation.
>
> (Marcus, 1995: 102)

Hence, the individual locations where multi-sited ethnography takes place are dictated not by a cultural or spatial connection between them but by the following of certain objects determined by the research interests. Thus, much of the logics of multi-sited ethnography lie in following elements such as objects, metaphors, plots, stories, lives, or conflicts. The ethnographical sites of observation can still follow hierarchical logics of scale. For example, Fortun

(2009) organised her classic study of the Bhopal gas leak around what she described as macro, meso, micro, and biomaterial levels of globality and locality. However, she made an important point when doing so: in attending to those different levels, it is necessary to be constantly mindful of scalability and harmonisation concerns. Each level offers its own perspectives that are interwoven with every other's. Accordingly, I made sure to consider the individual levels in my research while simultaneously taking into account how certain concepts, ideas, and actors are produced across them.

In such respects, multi-sited ethnography offers greater flexibility than does classic single-site ethnography. However, it is still attached to the physical space, in the manner conceptualised by Marcus (1995). Indeed, as Star (1999) has noted, extensive and diffuse information systems may not suit the classic, traditional ethnographic approach. A wide temporal and geographical distribution of connections may well demand new ways of approaching ethnography. Furthermore, well-implemented infrastructures turn invisible for those who inhabit them, especially in the process of becoming part of a membership community that has naturalised the infrastructure and the categorisations that it offers (Bowker & Star, 2000). This renders parts of the spaces not only non-physical but, actually, invisible to those occupying them.

Studying big systems that feature large-scale information infrastructures does have its advantages, as they generally offer 'almost ready-made "fieldnotes"' (Star, 1999: 384). Indeed, gathering relevant documents can become an easy task when it involves browsing online archives of digitised material and when one has access to minutes, agendas, and reports of meetings that one never could have attended physically. That said, its downsides too should be taken into account. For example, identifying relevant information and actors in such masses of information is not easy. One can easily be overwhelmed by the quantity of data that databases make available.

Here is where assemblage ethnography[29] can come into its own for our purposes, as a practical approach to ethnography that looks at how policy assemblages emerge instead of focusing on specific sites or specific policy

[29] Youdell's 'assemblage ethnography' is not to be confused with Ken Gale and Jonathan Wyatt's (2013) proposed 'assemblage/ethnography'. Although the two stem from similar work and inspiration, the latter is a much more radical proposal that carries the subject/object of research and the very researcher into a state of assemblage, thereby questioning our ability to stick to the normativised self and proposing instead identities understood as assemblages (Deleuze & Guattari, 2006) and diffractions (Barad, 2007; Haraway, 1997). In the authors' words, their suggested shift is 'about saying no to "nouning" and fixity and yes to fluidity, verbs, dispersal of the self, uncertainty' (Gale & Wyatt, 2013: 148). Although I am sympathetic to Gale and Wyatt's approach, my research is positioned closer to Youdell's perspective, though I maintain constant engagement with some of the critical, social, and philosophical theories that inspired Gale and Wyatt.

implementations. It thereby offers some solutions to these quandaries by following information, materiality, and practices through numerous governance networks. **While I have used assemblage ethnography as a way to select, compass, and arrange the empirical material, the concept of assemblage itself, as discussed in the previous chapter, remains a key theoretical tool for understanding the actors featured in it.**

Hence, my understanding of the empirical material in the light shed by assemblage ethnography has led me towards conceptualising the various organisations, experts, governments, and other social actors as assemblages that engage both in 'mobile and in productive relationships', with an emphasis 'on movements and flows, [...] and the multiple significances, potentialities and realizations of these' (Youdell & McGimpsey, 2015: 119). In other words, the actors and entities that conform to the social spaces of pandemic preparedness and response are not static or independent elements that produce a closed list of involved social actors. Rather, the limits and responsibilities of the WHO, the EU, and the individual MS are constantly redefined in light of the various co-ordination and implementation agreements that they draft together. Thus, as Karen Barad (2007) might describe it, their emergence as distinct social actors that can be identified as such is a product of the productive relations they engage in.

Assemblage ethnography did not divert my focus from international biopreparedness logics and practices. What it did do was aid me in moving around the digital and physical spaces of the pandemic network that were accessible to me. This need not entail forgetting the meetings where preparedness policy is made, the formation of expert communities, or the laboratories where viruses are researched; rather, it can afford paying attention to how all of these emerge as parts of larger assemblage formations (Youdell, 2015) – in other words, as actors that emerge through productive relationships around pandemic emergencies.

In assemblage ethnography, the understanding of social actors involves resisting the temptation to draw reductionist representations of individual networks as lists of actors connected statically with each other. That, as Youdell and McGimpsey (2015) point out, would misrepresent the assemblage as a **structure**. In contrast, the objective with the assemblage ethnography tool is to follow lines that are associated with certain political productions across arenas – such as the bounds of governance and policy networks, institutions and professional communities, subjectivities, and the civic and social practices that people engage with in day-to-day life – where those arenas take shape as the empirical and analytical work develops. Again, they do not function as a closed list of elements to look for in a specific field. While some of the actors I approached were part of my plan from the beginning, the final list emerged from how I was able to learn about new and interesting political arenas that were accessible to me.

Finally, Youdell and McGimpsey (2015) insist that assemblage ethnography is more a kind of pragmatism than a method. It does not specify rules for empirical work so much as conceptualise the methodological in terms of mapping productive relations that take place across varied scales, spaces, and temporal dynamics. Moreover, in achieving this end, it allows for the creative use of diverse methods – in the context of this thesis, ranging from interviews and participant observation to document analysis – to account for the various ways in which the assemblage unfolds. One of the consequences of this open approach to methodology is that the ethnographer is forced to take an explicitly political position, with every decision dependent on constructing the narratives that describe the object of study. The approach offers an inherently partial view of the world – i.e., a view from specific positions that are defined in accordance with the digital and physical spaces visited.

4.2 GLOBALISED SITES OF RESEARCH

To follow pandemic assemblages, I needed a starting point, a choice of sites where I would begin engaging with the actors constituting them. Since I could hardly cover the whole world of pandemic threats – who could? – I had to settle for a partial view, conferred by specific positions for collection of data. Several pieces of literature point to possible ways to focus in this endeavour. These works have focused on laboratories (MacPhail, 2014), on community preparedness (Caduff, 2015), on state officials (Samimian-Darash et al., 2016), on specific national contexts (Lakoff, 2007; 2008), and on farms (Keck, 2015). These are noted not to separate the sites into isolated subsets but to stress that different starting points lead to different destinations. In my work, I settled for a wider net, for a starting point that could account for the emerging assemblages that I wanted to look at in my research.

In this process, the view 'from somewhere' that I considered in the previous section is translated into something else, something multiple and plural. The 'from' meant that I had to start moving, to start occupying new spaces, therefore changing my worldview and the multiplicities that I engaged with. This could readily be part of what Anna Tsing (2005) has called a 'historical and ethnographic examination of scale making, […] the study of the messy and effective encounters and translations of globalist projects – for the postcolonial denaturalising of globalisation', as W. Anderson put it (2014: 378). W. Anderson continues this line of thought by noting that one cannot dwell in the global; one dwells in the many sites that configure it. My research took place in precisely those terms: I visited some of the localities that configure the global, both spatially, as in Marcus's multi-sited ethnography, and digitally, as in Star's 'infrastructure ethnography'.

To address myself to those localities, I decided to commence my empirical work by approaching certain sites that were accessible from my starting position, that of a researcher at a European university. To do this, I identified levels of preparedness governance that seemed relevant in light of the literature review presented in Chapter 2 and from preliminary analysis of EU documents. One consequence became evident fairly early on: my initial plan for gathering material looks somewhat different from the set of sites that I would end up visiting. In selecting the places at the outset, I drew from the idea of looking at sites where global health is made through local instances. Throughout these efforts, I strove to remember that the global is constituted not of a unitary globe but of the many practices, enactments, and performances that contribute to such globality (Blok, 2010; Law, 2004b; Tsing, 2005).

The first assemblages I considered were therefore rather artificial. In other words, I began with imagined assemblages – or communities in the sense meant by Benedict Anderson (1983) – that corresponded to the conception of global health I had been forming on the basis of the literature. To study those specific empirical assemblages, I had to possess the necessary skills for that study and for gaining access. Accordingly, one criterion was for me, as a part of the becoming-assemblage process myself, to be competent linguistically, culturally, and socially in the sites chosen. **Accordingly, I proceeded to draft my initial research design by dividing the world of global health into three levels: global, European, and national. These levels were then associated with the most relevant health institutions: At the global level, the WHO seemed to be the most visible authority. At European level, I selected the ECDC and the relevant directorates of the EC. Finally, at the national level, I chose three European countries: Finland, Spain, and the UK[30].** This selection was aimed at giving a good overview of sites and locations where global health is made while ensuring that I would consider multiple levels of actions and decision-making.

4.2.1 FOLLOWING THE ASSEMBLAGE

The objective was to enter 'the field' and there follow the various connections I could trace between actors. As I have already mentioned, obtaining empirical

[30] Choosing three, quite different countries might give the reader the impression of a comparative study that follows the logics of 'methodological nationalism' (Beck, 2002). This is not the case. As I pointed out in the previous section, multi-sited ethnography does not understand the individual sites as purely equivalent units of analysis (Marcus, 1995). Rather, the choice of these different sites is aimed at showing partial and fractured views of pandemic threats as well as sites where health is made global. Looking at multiple sites hence forces the analysis to integrate potential variabilities and multiplicities that may contribute to the making of global health. Accordingly, the main interest behind studying national cases lay not in learning how they enact their health-care systems but, rather, in understanding how they engaged in international preparedness and globality. In other words, my aim was to understand how they dealt with threats that transcended their national borders.

material about pandemic processes was often a difficult and arduous task. Issues of accessibility and clearance frequently played an important role in determining what sort of information I could access or what personnel I could talk to. The institutions were always there, but the dialogue was present only intermittently. Hence, the practical unfolding of things had to turn out somewhat different from my initial research plan.

The setting described above provided me with a map to guide my enquiries. My approach to those institutions involved three forms: documents, interviews, and participant observation, where the use of one or another technique would depend on accessibility. Therefore, from the different sites I chose and encountered, I gathered a wide array of material. Even though most of it takes the form of text (of policies, strategies, protocols, Web sites, laws, and other materials), sometimes other relevant (audio-visual and even interactive) types of content appeared. To add depth for some of the topics, the research design included 15 interviews with relevant personnel on the topic in question, at least three from each of the entities chosen in advance (the WHO, the EU, Finland, Spain, and the UK). Finally, because a preliminary reading of the material revealed that accounts of implementations 'on the ground' seemed mostly absent from governmental publications and were often not up for discussion in the interviews, I added articles and scientific news items gathered via subscription to various e-mail alert services provided by relevant scientific journals and Google Scholar. The scientific news and other articles had the added value of supplying regular reporting on pandemic events and, especially, adding material preceding or subsequent to declarations of health emergencies by the WHO.

Following the assemblage sometimes took me to unanticipated places while I was not allowed to visit some I had planned on exploring. Firstly, what I had defined as global level (primarily the WHO) proved ultimately inaccessible for interviews. E-mail yielded no responses, and intermediaries too were unable to get any answers. Simultaneously, at national level, organisations that took a security-oriented perspective to health – i.e., the military – proved hard to access on account of security concerns. Of the three military organisations approached at the national level, only the Spanish one ultimately agreed to an interview. As for Finland, I was able to secure an appointment for an interview, which then was cancelled and never rescheduled. More than a year later, when I was already in the phase of analysis, I had an opportunity to interview somebody with knowledge about the military sector, though with a position in a different institution. Finally, in the UK, an expert for the military agreed to be interviewed but was unable to obtain the necessary security clearance. Positive outcomes of various types emerged from not being able to follow the designed plan. As I navigated the networks of global health, I found access and information in unexpected places. The first of these emerged while I was seeking those WHO interviews at the global level: I was invited for a six-week

stay at the WHO Country Office (CO) in Cairo. While there, I had a chance to interview people working at the WHO's Eastern Mediterranean Regional Office (EMRO) also, some of whom had extensive international experience at many levels. Though one can never know the paths not travelled, this probably offset much of the lack of access to informants situated at the global level. In addition, being based at the WHO Egypt CO gave me an opportunity to integrate into my corpus information a fourth national case, which added more variety to the picture in my study. Secondly, I was invited to attend the Meeting of States Parties to the Biological Weapons Convention that took place at the Palais des Nations in Geneva on 14–18 December 2015. Both of these experiences helped me understand some of the work behind the documents that I had been analysing, adding a very interesting situated ethnographic component to my research.

It is important to note also that not all materials play the same role, even if they all are essential to the construction of the analysis. For example, documents typically play a central role for extension and background. In my research, these were the most accessible item in pandemic preparedness and response, thereby playing an important role for their sheer quantity. They allowed the body of material to be extensive enough to cover quite a few multiplicities and sites in the field of public health. Personal interviews, in turn, while much smaller in number, are often very dense in meaning and therefore play a very important part by helping to deepen insight into some key issues that only begin to emerge in the documents. The interviews hence offered a shortcut through the repetitive and bureaucratic information that very often occupies a large amount of space in public documents and, in so doing, obscures other elements. Giving a completely different perspective than both institutional documents and interviews do, scientific articles are concerned with another side of the story, getting much closer to practices and the actual emergencies. That perspective makes them the perfect complement as they connect the virtually developed policies, protocols, and regulations with actions and implementations. Finally, ethnography was useful for getting to know the work behind those documents and understanding how the pandemic expert community interacts in physical spaces.

The complete set of materials was composed of 286 documents. This includes 186 official documents (of which three were videos), two field diaries, 18 interviews (all of which were transcribed for analysis), and 80 scientific articles. Annex 1 provides a detailed list of all these materials, the sources they are associated with, and the reference system I use throughout the following chapters.

4.3 THE ANALYSIS

From the outset, the way the material was collected – by following actors through pandemic networks – added a crucial analytical element to the thesis

project. Gathering the empirical material, choosing the actors, and visiting sites functioned, to a certain extent, as a preliminary analysis. The most central part of the analysis, however, came after this, with the subsequent concretisation via the qualitative analysis software ATLAS.ti.

It is important to state at this juncture that **the analysis was empirically driven**[31]: **no specific theory or pre-existing coding frame was used to identify relevant categories or instances in the body of material analysed**. **In contrast, the analysis was focused on identifying salient and meaningful patterns and categories in the light shed by the areas of focus formulated, yielding a coding frame that developed from the material.**

This is in line with the emphasis on changing, in-the-making boundaries and classification expressed in the main aim for the project and my research questions (see Chapter 1). Using empirically driven content analysis[32] as the core process in my research is intimately connected to the will to uncover how the various actors were described and categorised in the material. By looking for the categories used by the interviewees, organisations, and scientists I studied, with a special focus on unveiling the variation and difference in how those categories were described, I could start to understand how particular categories were constructed and articulated while, at the same time, becoming productive in their own specific ways through preparedness and response implementation.

This emphasis on unstable and changing boundaries was anchored further by relating it to the focal areas of governance, knowledge, and threat conceptualisation, with the theoretical tools and concepts used to frame and understand the themes of the analysis being built retrospectively. That is, in the analytical conversation the themes and categories have been positioned in relationship with relevant theoretical literature published earlier that can contribute to their better understanding. This includes the theoretical tools presented in Chapter 3, which function as a general theoretical frame,

[31] The approach taken resembles that of 'abduction analysis' as formulated by Stefan Timmermans and Iddo Tavory (2012), especially in the steps of 'revisiting the phenomenon' and 'defamiliarization'. However, my approach shifts the emphasis somewhat from producing new theoretical formulations towards building on existing ones in efforts to emphasise the empirical elements and the nuances that this work adds to existing theoretical discussions.

[32] My content analysis was inspired by the principles of data reduction, systematicity, and flexibility, by which content analysis often is characterised (Schreier, 2014). However, to be able to pay attention to the changing features of the categories in the empirical material, I adapted the usually more rigid steps of content analysis and the building of a coding frame to a more dynamic context. For a higher level of consistency and reliability, I make explicit the application of data reduction, systematicity, and flexibility throughout my detailed explanation of the analysis process.

alongside several theory-based ideas introduced in the following chapters. The latter serve as heuristic tools specific to the area of focus for each chapter in its turn: governance, knowledge, and conceptualisation of threat.

The main objective behind my categorisation and coding processes was to identify relevant themes and patterns that could later be used to address my chosen areas of focus and be examined in light of current literature. This identification was carried out in five steps:

1) Categorisation of the documents
2) The first reading and content analysis
3) A second reading and refinement of the coding frame
4) Refinement of the list of categories
5) Mapping of the most salient code families

The first step, document categorisation, consisted of organising all of the documents gathered, including material from interviews and ethnographic diaries, to form document families (groups of related documents)[33]. The grouping was based on the organisation or context that the materials were associated with: WHO, WHO EMRO and Egypt, Biological Weapons Convention, EU, Finland, Spain, UK, and scientific articles.

The second step was a basic content analysis. I read through all the material and formed quotations (the base unit of analysis) from the empirical elements that I considered interesting in light of the formulated focus areas. A quotation usually consisted of excerpted text, but quotations also took the form of tables, figures, and extracts from audio-visual material. Each quotation was then coded (categorised) by means of either creating a new code or assigning a code that had been created for previous quotations. In connection with this step, it is worth mentioning that the process of analysing the material revealed reference to a great variety of diseases. Because of the interest in pandemic processes and emergencies, special attention was paid to those that were presented as having pandemic potential – which also often received more coverage. Over the time this research was carried out, these were influenza, MERS-CoV, and Ebola[34]. Documents related to each of the diseases were sub-coded as new document families specific to that disease.

In the third step, I reviewed the quotations and the codes that had been assigned to them. I read the quotations created a second time, and I assigned to them possibly relevant codes that I might have overlooked in the first reading.

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[33] I use ATLAS.ti nomenclature since the types of categorisation structure that the software offers play a relevant role in how my categorisation system is organised. I use brackets to clarify the nomenclature for those unfamiliar with the software. Also, Annex 2 briefly clarifies ATLASt.ti-specific nomenclature.

[34] Zika started to appear toward the end of the data-collection process: the last interviews coincided with the weeks of its outbreak. While related references were analysed, they did not constitute enough material to warrant a separate category. Consequently, Zika is cited as an example considerably more sparsely in the thesis than the other diseases are.

This allowed me to reflect on the quotations in a new light and modify the associated codes by adding them to or removing them from a given category. In the fourth step, I went through the resulting list of codes. I revised it by removing codes that had been left without any quotation and by merging redundant codes. I also grouped related codes as family codes (second-order categories), which came to be the most relevant list for construction of the narratives of the analysis. The final code structure was useful for easily finding quotations related to a specific theme. Annex 3 shows the final code structure.

The fifth and final step consisted of the construction of code maps (see Annex 4). In these, I draw the connections between the most salient family codes in association with the three key topics (again, linked to my focus areas of governance, knowledge, and threat conceptualisation). The maps are not depictions encapsulating the whole coding system, comprehensive descriptions of all the topics represented by the material, or graphic representation of the final analysis. Rather, they function as heuristic tools for managing connections between themes, actors, and elements. In other words, they work as snapshots of the analysis process at a specific point in time, albeit a crucial moment, just before writing up of the analysis. Therefore, irrespective of the neat connections shown in the map, each code was not distinctly related to a key topic. Instead, as I stress throughout the analysis chapters, the areas of focus and the various codes are interconnected.

Together, the coding frame and the conceptual maps are the underlying substance fuelling the chapters that follow. Hence, although I do not make explicit references to them – in fact, they will become almost invisible to a certain extent in the written analysis – they are at the core of the narrative. Furthermore, they serve the additional purpose of providing the reader with a more extensive picture of the reach of the analysis.

4.3.1 IDENTIFYING ASSEMBLAGES

Although the way the threatening, the vulnerable, and the expert assemblages emerge becomes clearer throughout the analytical chapters, it is useful to formulate them methodologically here. In the previous chapter, I defined assemblages as useful for describing the hybrid and processual character of identification and categorisation processes. They are formed by a wide array of social actors but also by their connections, by their shared characteristics and knowledge, by their agential potentialities, and by the way their identity comes into constantly new being as a result of their assembling together. Accordingly, assemblages are not only a way to describe actors that interact with each other but also a tool to draw our attention to how the identities and characterisations of those actors become something else through intra-actions (Barad, 2007). Before continuing, I would like to describe assemblages by

referring to their ontoepistemological status, their methodological emergence, and their naming logics. This helps to make them more explicit and to pinpoint the key features that render the concept of assemblage especially useful in the context of pandemic threats.

Understanding the **epistemological and ontological status** of assemblages as a unit is a way to recognise that assemblages do not emerge in association with entities for which some sort of natural status is claimed. Rather, assemblages are always fruit of social relations. Therefore, their ontoepistemological status is necessarily a sum of several factors:

- The mutual engagements between human and nonhuman actors
- The ways in which specific social actors are enacted in institutional and scientific narratives and from their perspectives
- My analytical choices during the analysis

These three components, which tie in with the way I have been theorising thus far about identities, categories, and actors, correspond to more specific ways of identifying assemblages as outputs of **methodological work**. Accordingly, the analysis process that I describe above was useful for making those engagements, enactments, and analytical choices explicit and concrete. Accordingly, from a more practical perspective, assemblages emerged through three methodological practices in my analysis of the empirical material:

- Paying attention to enrolments of actors and associations between them, both as they change and in the making
- Taking into consideration actors that were able to maintain a uniform identity despite emerging across categories and notwithstanding their fulfilment of multiple roles
- Looking for accounts in which overlaps between actors and networks were made explicit

As I analysed my material thus, I noticed a pattern wherein human and nonhuman actors were often defined in terms of how threatening, vulnerable, or expert they were. Identifying actors in one of these ways also made possible the carrying out of certain preparedness and response strategies. The main objective with these strategies was often to govern the belonging of specific actors to specific categories. In **naming these three ways of grouping social actors** in institutional and technoscientific narratives, I tried to rely on descriptive words that would contribute to a clear understanding of them. That is, my objective was that the name of the assemblage easily connect to the role of and expectations for each actor when said actor becomes threatening, vulnerable, and/or expert.

4.4 ETHICS-RELATED CHALLENGES AND REFLECTIONS

Naming assemblages, categorising actors, and stressing specific sections of the corpus of empirical material is never bias-free. Notwithstanding all the efforts at thorough and rigorous methodological work that I have described in this chapter, doing research forces one to make decisions and choices that condition the final outputs and conclusions. It is therefore important to reflect on the limitations and ethics-related challenges of this process. Although some of these challenges and reflections are in evidence throughout the thesis (as may already be apparent), crystallised in relation to specific arguments and situations – especially in the research recollections offered at the beginning of each chapter – I find it valuable to start drawing this consideration of methodological considerations to a close by making these explicit. With this brief but crucial section, I wish to highlight three things that I consider to have been especially challenging in the conducting of my research from an ethics perspective.

Firstly, as many of the research recollections make explicit, my position in my research, and in the field, was constantly in the making and, therefore, constantly ambivalent and challenged. My background as a European social researcher allowed me to access certain spaces and engage in conversation with certain authorities, but it also did much to determine the focus of my research, which puts empirical emphasis on Eurocentric spaces of governance (the EU, Finland, Spain, and the UK) and research (scientific articles and news published mostly in English-language journals). My knowledge is situated accordingly (Haraway, 1988). Just as I argue that global health is not as global as the word might indicate, I find that my research, its broad scope notwithstanding, has always been limited by my position. By nature, then, this thesis cannot give a complete view of the world of pandemic preparedness and response; rather, it speaks to the spaces and information I could access from my specific position. This is restricting but also of value. From the position I held, I decided to pay attention to emerging but not-yet-established actors and narratives: alternative views of threat and disease that were not widespread in the material. In my analysis, I try to emphasise those in particular, as I think they are the views that are not outright evident from my position. I consider them to be othered narratives that can probably aid in constructing visions of global health that are not more truthful but are more multiple in nature and more attentive to the different social realities that feature in pandemic narratives.

Secondly, I have consciously thought out and decided upon the categorisations and themes that I have used and emphasised in my analysis and in the writing. I do not take these to be givens from the empirical material (although I have made a special effort to understand what messages and ideas those involved in the empirical material tried to convey). I understand these

categorisations as what Barad (2007) has called 'agential cuts'. By my decision on these categories, I describe the world I study but I also help to construct it, and an agential responsibility comes with that activity: an ethical responsibility. Hence, although the list of categories that can be found in the annex extends well beyond what I discuss in this thesis, the selection of topics covered in the thesis maintains a clear connection with my interest in categorisation, identification, and othering processes. This, of course, enforces a rendering of a specific version of pandemic threats that I find relevant in light of my framing in the previous three chapters.

Thirdly, one of my main concerns has been to keep informants' identities anonymous and private. This was an explicit element of the interview process, and anonymisation was offered to all interviewees. In the presentation of my work throughout the following three chapters, I have gone to added effort to balance the contextualisation and positioning of the quotes I present with the anonymity of my informants: although I point out the expertise and role of the informants, I always try to keep these descriptions general enough that their specific identities remain unknown. Maintaining this balance is important for ensuring that the narratives I present are situated and positioned properly. Indeed, all of these narratives are woven in with institutional and technoscientific networks of expertise that are often associated with the preparedness and response mechanisms that come into action once an emergency is declared. The same is true of the informants. Hence, they occupy positions of responsibility – as I will argue further in the concluding chapter – but that responsibility is also necessarily distributed across the assemblages in which they are embedded and hence allows space for confidentiality.

4.5 THE VALUE OF EMPIRICAL ASSEMBLAGES

Methodology-oriented chapters, as do the ethics-considerations sections usually embedded in them, typically mark a departure from the main narrative of research stories. They sometimes assert their space abruptly in the middle of the tale, and so they should, as reminders of what is often not visible, what happens offstage. They remind us of something that is particularly difficult and hard to grasp in research: the connection between ourselves and the visions we wish to convey. The methodology chapter, which may often seem an 'obligatory passage point' (Callon, 1984) for doctoral research, has become a way for me to understand my role in the research and to convey my vision of the field I study. Therefore, its significance should not be understated. Mindful of this, I would like to use the end of this chapter to convey two key methodological reflections that stem from the same source. In most of the readings and literature I have used for this thesis, methodological sections are not the norm. Certainly, this type of section is encountered more readily in experimental settings, usually to allow (or give a sense of) a sort of scientific hard-fact replicability. However, in critical social sciences, these sections have

actually become rare, perhaps because of 'baggage' of a connection to values of scientific truth that, especially from science-studies perspectives, have been extensively criticised.

I maintain that these sections have an important role to play in critical social science. This role can be summarised via two points. Firstly, they serve an educational purpose. I and my fellow PhD students often engaged in hours of discussion of how to carry out good qualitative research; what it means to be thorough; and, especially, what it means to be thorough **enough**. In many of the articles we read, analysis procedures and the interaction between researcher and empirical material were an unopened black box. How much surer we would have been of how to proceed with our research if we had been able to read how those researchers we so admired had proceeded with theirs! This is a matter not of methodological theorisation[35] but of examining the research practices behind the research we do, behind what we write and read. If practices have taken a central role in the social arenas we are interested in, in the lives of our informants, in our conceptualisations of the world, we would do well to extend the practice turn (Schatzki et al., 2001) to our own practices in research. Our humble practices are as central as our complex theories and narratives.

Secondly, if we are to study assemblages, networks, and hybrids in the worlds we explore, we must acknowledge that we become part of them as soon as we approach them. To understand pandemic preparedness and response, I had to become part of it. As my research recollection at the start of this chapter attests, I attended meetings, engaged in discussions with policy-makers, and was even asked to submit reports in exchange for 'being allowed in'. Reflecting on – or, rather, diffracting, to use Donna Haraway's (1997) and Barad's (2007) more radical proposal – such relations with our empirical material and our research is not only a way to understand how research is done practically but also an analytical element in itself. It is for this reason that I have been opening each chapter with snippets from my diaries and recollections. This is a way to bring my life into the research and the research into my life, since the two inevitably played a decisive role in shaping one another.

[35] I do not deny the value of methodology-oriented theorisation; indeed, there are some very inspirational works of this nature. Among those I hold in highest regard are many of Haraway's texts (e.g., Haraway, 1988; 1997) and John Law's (2004a) comprehensive summary of post-structuralist methodology *After Method: Mess in Social Science Research.* In my reflections here, however, rather than focus on the value of such theory, I attempt to emphasise the value of presenting methodological processes (including details of methods) and analytical discussions together.

5 A STAND-BY GOVERNMENTAL APPARATUS

> *As advised by several people, I spend the day at home. I don't do much, really. Besides, it's raining. I sometimes look outside to see whether there is something happening. But nothing. You hear a lot less traffic than usual, only the police sirens are much clearer because of the lack of those other noises. I follow the news, waiting, almost hoping, for something to happen. Hoping because if nothing happens, what has all this fear been about? If I do not get to use all the ideas and emergency plans that I have constructed in my head, what have I been preparing for? While writing this, I think of the connection between preparedness for biological threats and preparedness for political conflict. Fear, as Massumi says, is not only a psychological state but also a societal one. If we are all hoping for the next pandemic, preparing for it, dedicating a huge amount of resources to it but it never comes, what did we use all those resources for? Why did we spend so much time preparing?*
>
> *Cairo WHO Diaries, 25th January 2016*

I arrived in Cairo just a few weeks before 25 January. That day was remembered as the anniversary of the 2011 start of the Egyptian revolution, which resulted in the ousting of long-time dictator Hosni Mubarak. In 2016, the situation was still very tense, and Egyptian president Abdel Fattah el-Sisi feared new protests against his unpopular government. In the weeks leading up to the anniversary, the government had stepped up raids against the opposition and the presence of the police and the army in the streets kept growing. They were preparing for conflict. I was too. Everybody seemed to be.

As I described in my diaries, the day was awfully quiet, at least from what I could see and hear from my rooftop flat in the neighbourhood of Ad Doqi. I stayed at home, as all my friends and colleagues had advised, listening to the silence outdoors. However, it was not so quiet everywhere. Small-scale conflicts and clashes between protesters and police flared up in various spots across Egypt. Also, even though nobody would hear about it for weeks, PhD student Giulio Regeni, in Egypt on an exchange programme, was kidnapped that day. His corpse was eventually found in the middle of the Cairo–Alexandria desert road, with some investigations pointing to the Egyptian police as responsible for the killing[36]. Things did happen that day, even if they were

[36] Even though we had never met, Giulio Regeni's death, because of the circumstances, felt strangely close to me. This is a hard topic to discuss in the middle of a dissertation. My affects and emotions spill over while I write this, pushing me towards abandoning academic language. Nevertheless, I feel

covered by the repressive silence. Yet all seemed to be business as usual the next day when I left home, heading to my office at the Ministry of Health, in front of the heavily guarded Egyptian parliament. As friends explained to me, people had no energy left for fighting after two revolutions in two years.

This first-hand experience with an uncertain threat helped me connect many dots toward understanding the workings of preparedness. Just as the preparedness apparatus does, I imagined a host of scenarios: protests, clashes, violence, investigations, and suspicions. Certainly, imagination can go a long way when the specifics of the threat are unknown, when, in Massumi's (2005a) words, fear takes over our actions (see Chapter 2). My response was to imagine actions and strategies that I could apply whenever the unknown threat might arrive. In this chapter, I follow this process for pandemic preparedness. Proceeding from the empirical material, **I describe some of the strategies laid out in documents and the interviews for facing upcoming threats**. **In contrast to my imaginings in Ad Doqi, these practices have resources behind them and are actually implemented. In other words, they have not only discursive but also material effects.**

One of the effects of those practices is the enactment and production of specific threats. Thereby, threats that are yet unknown get a bit more known once preparedness practices start to take place. That is, in preparing for a pandemic, the pandemic itself starts to emerge and its virtual identities start to take shape. In this process, two sets of boundaries are especially relevant. The first is **a temporal boundary** that separates the not-yet-threatening from the actually threatening. This boundary emerges as **health preparedness organisations attempt to identify the threat** before it is actualised, defining the threat in terms of its temporality. Second is a set of **institutional boundaries** that are challenged through the implementation of preparedness practices: various sorts of actors, organisations, decision-makers, and experts are brought together to design and implement preparedness. When those boundaries between institutions become blurry, **the expert assemblages take shape**. For example, by becoming a WHO member, a country joins the biggest expert assemblage in the world of health.

This chapter, which begins the analysis proper by considering 'stand-by' phenomena, is divided into three sections. Firstly, I describe a **stand-by apparatus** forming part of the larger expert-preparedness assemblage. Building upon Samimian-Darash's (2011; 2013) conceptualisation of the virtual and the actual that I introduced in Chapter 2, I describe the way in

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compelled to bring visibility to this appalling case, especially in spaces where it might be unexpected, such as this. More information can be found in connection with the social-media campaign titled 'Verità per Giulio Regeni' and with an Amnesty International initiative that I encourage to sign. See https://www.amnesty.it/appelli/corri-con-giulio/.

which the strategies and mechanisms described in the empirical material are understood as responding to virtual threats while having an effect in the present. Through its attempt at reconciling the virtual and the actual, the expert preparedness assemblage deals with the temporal challenge I described above. Secondly, I use the empirical material to describe the infrastructure that underlies the stand-by apparatus, which is established through production of **stand-by networks**. These are loosely connected social networks that – through co-ordination, sharing, and responsibility arrangements – can be activated in an encounter with an emergency. They are born out of biosocial processes around the biological forms of life that give identity to the pandemic threat. In the third section, I present three examples of strategies and practices that are **practical manifestations** of the stand-by network: stockpiling, the training of specialist units, and the drafting of plans and protocols. As the networks are, these are carried into practice with an eye to an uncertain future event, and they need to remain flexible and open accordingly. They demonstrate how preparedness can have sociomaterial effects. I conclude the chapter by arguing that stand-by governance, networks, and practices are dependent on knowledge-making and knowledge-distributing machinery that can inform and that can fill the knowledge gaps arising from uncertainty and flexibility.

5.1 GOVERNING GOVERNANCE

I began the chapter with musings about preparing and waiting. Indeed, in preparedness work, most of the time is dedicated to preparing and waiting for an event to take place. In other words, pandemic threats are objects with an uncertain position in the temporal dimension. For us to start thinking about pandemic threats in these terms, I suggest returning to the figure of the PHEIC, described as a key tool for pandemic governance at several points in the previous chapters. Under the logics of the IHR, all the PHEICs declared since the IHR entered into force were both expected and unexpected. As I mentioned in the discussion of preparedness logics, the actualisation of a threat is taken for granted in these logics, even if its identity is not yet clear. In other words, we may expect the threat but not necessarily its identity. In fact, the narrative of an upcoming pandemic has been lurking in the field of global health since the emergence of the H5N1 virus in 1997 (MacPhail, 2014), only to be then made an even more acute threat by the anthrax letters attack in 2001. In consequence, animal communicable diseases and bioterrorism came to represent the same threat. It is this all-hazards approach that made pandemics expected yet with an unexpected identity. Pandemic threats lurk in the realm of the unknowable, the world of the bioterrorist or the animal. However, one thing is certain: they are lurking somewhere.

It seems only logical that, if a threat is on the horizon, society should prepare for it. The role of the PHEIC is to signal the point in time when the

resources accumulated through implementation of preparedness become productive. In so doing, it turns a virtually defined threat into an event in its own right. Thus, the figure of the PHEIC marks a line between two phases of the fight against pandemics: between preparedness against a yet unknown threat and the fight against an actualised threat. In a way, PHEICs make the identification of a threat effective, turning it into an emergency. When I started to plan my research, the centrality of PHEICs soon created doubts in me surrounding one of my main interests: the governance of life forms during emergencies. The PHEIC's role seemed to be not to govern life directly but to point to when life should start to be governed.

This forced me to step back from my initial research interests and rethink my perspective. I soon discerned that most of the documents had little to do with governing life forms and more to do with governing governance itself. Most preparedness practices that I was reading about in policies, strategies, and reports were focused on arranging actors, materials, and networks that would later play a role in conditions of an actual pandemic, and the same was true of the practices narrated by my interviewees. It seemed as if preparedness was getting practical but, interestingly, in the most unexpected places. While analysing the material, I started to notice regular mentions of the term 'stand-by' in descriptions of such varied things as capacities (EU/D/55, 2009), facilities, committees (EU/D/44, 2001), evacuation systems (EU/D/76,2015), experts (EU/I/2, 2014), response teams, hospitals (WHO/D/35, 2015), advertising campaigns (UK/D/142, 2008), ventilators (UK/D/147, 2013), file-system structures, e-mail accounts (UK/D/152, 2014), and duty personnel (FI/D/105, 2010). This idea started to resonate and gave me a more practical sense of how the abstract preparedness logics could be applied in practice.

I started to conceive of some of the preparedness techniques as a sort of stand-by governance process whereby governmental organisms seek to prepare for biological emergencies by leaving everything ready and waiting to be triggered in the face of a biological event – i.e., upon the declaration of a PHEIC. Though this did not add much to the logics of preparedness that I reviewed in Chapter 2, it offered me a new way of thinking about the preparedness process, one that led to new questions: What sorts of practices and strategies are key to leaving things 'suspended' and ready? What can be done in advance, and what things need to wait? Analogously to how household appliances may be left on stand-by, neither completely off nor fully on, always ready to be used at a moment's notice, stand-by governance served as a trope for understanding preparedness and helped me focus the object of my research by examining what arrangements can be carried out in reality before an emergency is declared. In other words, the threat was made present not so much biomedically as organisationally. The virus ceased being a molecular life form, to become a bureaucratic fetish.

So it was that **the preparedness assemblage did not work directly with many of the material and biological actors that populate pandemic emergencies. Rather, these had been turned into objects of bureaucratic mien that allow governing biogovernance from a temporal distance.** This is governance of governance itself – in effect, a type of meta-governance. In fact, this concept can already be found in the literature (see, for example, Magalhães, Veiga, Amaral, Sousa, & Ribeiro, 2013; Meuleman, 2010; Meuleman & Niestroy, 2015; Peters, 2010), but the reference is mostly to the regulation and enforcement of different governmental styles in conflicting and devolved governance systems[37]. I refer to meta-governance in a different way (though not necessarily in conflict with previous understandings, rather more adding to them), for the governance of future governance. In other words, this is the governance of the mechanisms that eventually are going to take part in pandemic governance.

In other words, **meta-governance is understood here as focused on the governance to come, the biogovernance of the future, of the virtual**. Because the biological bodies to be governed are not materially available yet, they cannot be fully controlled. What can be governed, however, at least partially, are the bureaucratic and technical tools for it. This is what **stand-by governance** does: it governs the biological agents of the future, and it does so by, among other things, actively blurring or stabilising the temporal boundary between the pre-pandemic phase and the pandemic emergency. Foucault's reading of Machiavelli's *The Prince* (Foucault, 2008) is highly illustrative of this. For Foucault, Machiavelli's treatise is not about managing the prince's territories and populations but about handling the fragile relations among prince, territories, and population. Similarly, stand-by governance is far less about governing the living forms that enact the pandemic than about governing the fragile relationship between the present and the future threat – i.e., between the global health project and the future threatening assemblages. The preparedness assemblage is Machiavelli's prince, and the future is that prince's population and territories.

In this connection, the work of Samimian-Darash (2011; 2013) that I discussed in Chapter 2 is especially useful for considering how such

[37] In the literature, meta-governance generally is understood as involving two interrelated processes. Firstly, it is one aimed at managing differing governmental styles that could come into conflict. Louis Meuleman (2010) describes the ideal types of hierarchical, market, and network governance as coexisting styles that sometimes add to each other while at other times in mutual conflict. Meta-governance would be directed at combining them efficiently. Secondly, the term 'meta-governance' has been used to refer to the governance of devolved governance systems, which has proliferated amid growing autonomisation and decentralisation of certain political bodies (Peters, 2010), wherein each system may engage in its own style of governance. These two processes are present in pandemic preparedness, with the constant co-ordination on the part of transnational bodies being one example that I will discuss in the next section.

meta-governance becomes possible from an organisational perspective. Preparedness requires the construction of a **stand-by apparatus**[38], a series of networks and measures that are left on hold, awaiting the apparatus's activation. The construction of this apparatus implies the development of imagined and fictional scenarios. They become events notwithstanding their lack of actualisation: they are conceived, they are shaped, and they guide decision-making all while remaining non-actualised. As Deleuze (2012) points out, they already are half of our reality. In consequence, they guide our actions to preparing and help to direct our interpretations of actualised events. In other words, virtual events affect reality independently of their actualisation. This poses a temporal challenge for the governance of pandemics and the identification of threats.

This temporal challenge can be summarised with reference to two respects in which the temporality of the pandemic event is hard to pin down. Firstly, **the identity of the causative agent itself** remains a virtual multiplicity until a pandemic is declared. The latter comes about through the use of several truth-making devices, among them surveillance data and laboratory confirmation. This process does not merely unveil the causative agent; it changes the very identity of the disease (Caduff, 2015). Secondly, the moment at which the causative agent can be pinned down remains difficult to identify; that is, the temporal moment of **the declaration of an emergency is not clear-cut and becomes so only when it emerges bureaucratically** (in the international context, that occurs when the WHO declares a PHEIC). In other words, a declaration is a performative event: it is the declaration of a pandemic that makes the pandemic emerge. Therefore, the PHEIC serves as a mechanism by which the temporality of a given event gets pinned down. This is the perfect environment for stand-by mechanisms, which ideally await the declaration as the clear point for being activated.

[38] I use the concept of apparatus to describe a specific part of the expert assemblage. The concept helps me describe the networks formed during preparedness as something that has more specific orientation than an assemblage and that also is productive and performative. More specifically, in this use I echo a description in which Foucault (Foucault & Gordon, 1980: 194–195, emphasis in original), during an interview, cited three keys to understanding the functionality of the concept. Firstly, an apparatus is 'a thoroughly heterogeneous ensemble consisting of discourses, institutions, architectural forms, regulatory decisions, laws, administrative measures, scientific statements, philosophical, moral and philanthropic propositions – in short, the said as much as the unsaid […]. The apparatus itself is the system of relations that can be established between these elements'. The second key is 'the nature of the connection that can exist between these heterogeneous elements' – that is, 'between these elements, whether discursive or non-discursive, […] a sort of interplay of shifts of position and modifications of function which can also vary very widely'. Third is 'a sort of […] formation which has as its major function at a given historical moment that of responding to an *urgent need*'.

This way of thinking about emergencies and the policy implementations that precede them is clarified in the following section, with the aid of empirical examples. I will discuss how the infrastructure that underlies the stand-by apparatus is underpinned through the building of stand-by networks: loosely connected social formations that can be activated in the face of emergencies. Co-ordination, sharing agreements, and assignment of responsibility position these networks for contributing to smoother implementation of emergency plans and protocols. I will then consider how these networks enable stand-by practices, which are directed at making sociomaterial arrangements that can be left on hold until a pandemic event is actualised.

5.2 STAND-BY NETWORKS

The infrastructure that underlies the expert preparedness assemblage and its enactment involves many actors. Government institutions, researchers, entities in civil society, pharmaceutical companies, first responders, medical doctors, and health-care workers all come together to enact pandemic preparedness and its multiplicity. Clearly, then, pandemics are enacted not by individual biological agents but by collective assemblages that come together when emergencies arise but also before that. **A considerable part of the preparedness process consists of the formation of apparatuses and networks that make possible a global health response.**

For example, Theresa MacPhail (2014) has described the way in which researchers created networks of expertise that allowed pooling resources, samples, and expertise in response to the influenza H1N1 in 2009. According to her, in a parallel to the way that viruses exchange genetic information with each other through mutation processes, networks of researchers exchange information with new scientific actors, coming together to create new knowledge about viruses. In other words, in the scientific identification of a new virus, the exchange of samples, data, and knowledge is as essential as the genetic rearrangement that leads to the new virus. These scientific networks are crucial for the fight against emerging infectious diseases and for the identification of a pandemic event.

Similar to those knowledge networks are the governance networks that are put together for purposes of enacting efficient pandemic response. However, response networks are challenged by their stand-by nature and the absence of a specific pandemic process to battle. While microbiologists can rely on constant input of new samples – whether material or informational (Caduff, 2012) – collected in ongoing global surveillance projects, response networks are limited by the absence of specific material actualisations, though these do not prevent a material response (e.g., in the form of simulation and performative exercises, material stockpiling or the physical separation between wild and domestic animals) occurring before the actualisation. Hence, stand-by networks can be characterised as loosely connected social

assemblages that are brought together for the objective of a future interaction that will be more important and more productive than the original one. In a way, they are networks left half-empty that can be later populated with knowledge of various types, from scientific evidence to medical know-how or technical understanding. The content depends on the actors that are part of the network when it is activated upon the actualisation of a threat, with special attention to the way the biothreat and the resulting biorisk have been defined. Whilst, because they are forged in a very specific context and with certain virtual individuations in mind, they are not completely empty, for them to accommodate the necessities of biopreparedness, they must remain partly empty so as to be adaptable and flexible. They have to make up many possible networks and one at the same time.

For example, in building of CBRN preparedness capacity at the European level, one of the main actions was to form a 'European network of specialised CBRN law enforcement units'. Created by the European Council in 2011, this attempted to 'facilitate the exchange of information and good practices and organise joint training exercises', as was stated in the report on the implementation of the CBRN plan (EU/D/60, 2012: 4). Such networks are built also with the assistance of exercises. As one European preparedness expert told me in an interview, arranging exercises contributes to the creation of these networks in that they force members of separate agencies to interact with each other:

> I think that one of the, quite often, major benefits of [training] exercises is that you forge these sectors together in peacetime, so in case you get a real emergency, you already had contact maybe with complementary institutions.
>
> (EU/I/3, 2015: 25)

While this interviewee referred to simulation exercises at the level of the EU, this idea was present also on national scale. Another of my interviewees, a British emergency-planning officer, described one of the main challenges for preparedness as being 'to make sure the agencies, the organisations that are going to be involved in the response, have trained and exercised together' (UK/I/2, 2015). In this way, training, drills, and exercises are made into a sort of **bonding event** wherein professionals can build sufficient knowledge about the community and the various people involved in the preparedness and response network.

These interactions also serve the purpose of constructing and giving a common meaning to upcoming actualisations. Accordingly, exercises serve the purpose of constructing future threats (Adey & Anderson, 2012; Lakoff, 2006), while, more importantly, they serve the purpose of constructing and identifying those threats collectively. This contributes to the construction of a

sense of urgency against the threat (Lakoff, 2008) as well as to the construction and identification of relevant groups and social collectives such as security councils or the press (Anderson, 2010). The exercises therefore participate in the collective construction of opposed assemblages such as responders and threat, with those positions being vital for the organisation of the exercise. Indeed, all exercises follow a similar narrative wherein a group of experts is put together under the stress of decision-making before an unknown enemy[39].

Alongside the more face-to-face networks created during exercises and training, there are other means of network-building that become effective during emergencies. Several examples emerged during a conversation with a Finnish officer responsible for communicable diseases and vaccinations. In our discussions, she provided me with some examples of how bringing the relevant people and organisations together might depend on the size of a given response community and on the private or public nature of that community's work.

Firstly, she stressed the ease of building these networks in smaller countries such as Finland. In fact, the networks were in a way already built:

> Well, we have rosters for civil servants in other sectors but not the health sector, [...] because... well, what has happened in practice this far is that Finland is a small country; we know the people, who we are. [They] come to work when we need them, as it happens in practice, and it has happened in practice.
>
> (FI/I/2, 2015: 120)

In the excerpt, this informant stresses that there is no need for rosters in the health domain since people are easy to reach and involve. It is interesting that, rather than a protocol-subject process, building networks is characterised as a matter of practices: 'it happens in practice, and it **has** happened in practice'. Accordingly, there is no need to rely on specific policies or mechanisms for creation of networks that can react to an emergency, as long as the practices disseminated are already geared towards that. Since the community is small enough, there is existing knowledge of who is who and therefore of who can be readily contacted when needed. Such networks serve the same purposes as others described above; the only difference is that they are shaped without explicit interventions. This example is especially significant when compared with other systems designed to involve relevant personnel during emergencies. Actors in the UK, rather than rely on existing knowledge and

[39] Some of the reports analysed show these dynamics, which become especially visible in reports on exercises (see EU/D/46, 2007; EU/D/47, 2007; EU/D/50, 2008; EU/D/53, 2009; EU/D/57, 2010). The interactive presentation on the Atlantic Storm exercise that is accessible via http://www.upmchealthsecurity.org/our-work/events/2005_atlantic_storm/flash/index.html is especially illustrative.

responsibilities, resort to a gold–silver–bronze command structure, where gold refers to strategic command, silver to tactical command, and bronze to operational command. This position-based, as opposed to person-based, system helps to bring networks together even if their members do not know each other. Furthermore, it allows for substitute members to be used in the networks without the network's structure being altered and without affecting how the various members communicate.

Secondly, in the conversation with the above-mentioned Finnish expert, the forging of private–public partnerships appeared as another example of actors being brought together in the wake of emergencies. In our discussion, this informant recalled the participation of the private sector in the H1N1 response in 2009 and how the system was strengthened after it:

> I think it was very constructive because the private sector was doing their share on a voluntary basis, but now we have stated in this hopefully new legislation that they have to be part of it, the system, and they have to kind of co-ordinate the actions with the public sector, that there's no overlap, so there are no gaps, like working together more smoothly – that's the aim.
>
> (FI/I/2, 2015: 154)

Thus, the 2009 H1N1 crisis saw the private sector engaging in the collaboration and getting involved. More specifically, private pharmacies assisted with the distribution of medicine and private health-care centres participated in the vaccination campaign. However, this collaboration was considered something that needed to be improved, with it being stressed that the participation of certain actors in emergencies had to be regulated by legal mechanisms instead of left to their willingness. Enrolling them was deemed too important for any doubts of their collaboration with the response apparatus; as is stated in the excerpt, the legal component would ensure the network's proper functioning in times of emergency instead of it being left to a voluntary component[40]. This would help to officially enrol in the expert assemblage certain actors whose participation was not completely ensured.

Another example of a legally arranged stand-by network at the boundaries between the private and the public is found in the 'joint procurement agreement to procure medical countermeasures' (JPA), which is a 'pre-agreement' signed by Member States of the EU for the joint purchase of

[40] Finland's new Communicable Diseases Act (1227/2016) entered into force only in March 2017 so was not among the documents analysed; the corpus stopped growing in early 2016. The new act of law does indeed regulate, to a certain extent, the engagement of private laboratories and other private entities in such health-care efforts.

medical countermeasures during situations of emergency (EU/D/69, 2014). This agreement brings the parties together in advance of an emergency to counter certain market dynamics that may arise in an emergency. Indeed, market dynamics in general are not compatible with the threats posed by pandemics and bioterrorism (Lentzos & Cohn, 2014). This type of agreement also brings to the fore one of the fundamental characteristics of stand-by networks: addressing the need for flexibility. Because the circumstances of activation of the network are uncertain, there must be room for improvisation. Therefore, the JPA and its flexibility allow the members to interact as needs dictate. The agreement thereby works on a virtual-material dimension. In other words, it allows for the virtual stockpiling of countermeasures (EU/I/3, 2015: 69). They are virtual in the sense that they depend on virtually constructed futures and materialities, leaving the conditions for material's stockpiling on hold.

5.2.1 A BIOSOCIAL PROJECT

I hope that the empirical examples I have used make visible how pandemic preparedness brings countries, companies and other organisations, committees, professionals, and other social actors together. Indeed, one of the main characteristics of current security logics is the linking together of different institutions (Lentzos & Rose, 2009). Of course, at the centre of the argument for this collaboration remains the biological threat, embodied sociomaterially by the (virtually or actually) identified virus. In relation to this positioning, **I argue that the formation of these networks results from a form of 'institutional biosociality'** (N. Brown, Faulkner, Kent, & Michael, 2006; N. Brown & Michael, 2004), whereby biosocial processes occur within institutional frames that are always in flux through processes of regulation and governance. Just as new biotechnologies represent a challenge for regulatory bodies on account of their novelty, emerging viruses call into question the institutional boundaries employed to regulate them as threatening forms of life. As they move through new spaces, they push health institutions too across institutional boundaries. Here, I use the words originally employed by Nik Brown and Michael (2004: 208) in the context of new biotechnologies: pandemic preparedness regulations 'occupy highly unstable positions within regulatory structures, often limiting their effectiveness as instruments of oversight'. Such instability challenges institutional boundaries, bringing actors, institutions, and sectors together and, in so doing, enacting new productive relations and interactions. Even if the biological interactions that cause these networks to coalesce are not present at the moment of their creation, those interactions are projected through virtualisations, becoming the network's reason for being. Biological threats and the interactions they evoke are what keeps these networks going even if in their multiplicity, in their often vast extension, they are frequently at risk of losing their identity as part of the expert assemblage.

Some of the best-known accounts of biosociality have focused on phenomena connected with the Human Genome Project (Rabinow, 2008) and the involvement of laypersons in expert medical matters (Novas, 2008). Biosociality has played an important role also in conceptualisations in current accounts of biological citizenship (Rose & Novas, 2005). Brown and Michael's institutional understanding takes biosociality in a different direction, though, by bringing institutions instead of patients and citizens into this context. I find the configuration of stand-by networks to offer an interesting case whereby a given disease (in many cases, an unknown disease) brings together diverse social actors. The list I offered at the start of this section applies: From government institutions to individual health workers. Expertise related to communicable diseases and pandemic threats certainly varies from one of these collectives to the next (and within each of them). Therefore, biosociality can be understood as a process linked with the ability of an emerging biological phenomenon to garner attention and resources from a varied array of social actors and institutions (including those lay groups). This, as Rabinow (2008: 182) points out, is rooted in the fact that an emergent biosocial phenomenon is 'known in such a way that it can be changed'. In other words, the engagement of those various social actors influences how the given phenomenon gets enacted, engaged with, understood, and regulated.

Stand-by networks are a prime example of such social phenomena. Even if institutional forms of biosociality might lack the epic feel and the sense of heroism in the work done by patient associations focused on rare diseases, I conclude that they share similar logics: both have a vested interest in knowing, understanding, and eventually governing a biomedical phenomenon by tracking down and measuring its risks and uncertainties. In the analysis below, I draw from my empirical material to discuss three distinct biosocial mechanisms that aid in the creation of stand-by networks: co-ordination, sharing agreements, and distribution of the responsibility.

5.2.2 THE CO-ORDINATION OF EXPERT NETWORKS

The first of these, co-ordination, is aimed at offering a response that is harmonised across countries or regions. This can include the co-ordination of medical interventions, communication strategies, and/or travel and transport regulations. When asked about the difficulties of international co-ordination, a Spanish expert in health response described these as not necessarily difficult, pointing instead to a need for communication and constant discussion and for identification of the appropriate moments and forums (SP/I/1, 2015). In other words, the construction of networks and their proper functioning are fundamental to a co-ordinated response. The mechanisms for said co-ordination are not always present, however. Two examples from the

material help to illustrate this: co-ordination in the European Union and the EMRO region present two very different cases of possibilities for co-ordination. While the European Union provides the European region with the mechanisms necessary for co-ordination, the Middle East lacks those mechanisms, with the EMRO office compensating to some extent for the lack of such bureaucratic elements in the national systems.

Indeed, the European Union is well-known for an extensive degree of bureaucracy. For preparedness, Decision 1082/2013/EU, on serious cross-border threats to health, in force since 2013, established the necessary legal infrastructure for EU co-ordination related to health events that may affect more than one European country. One of the main concerns addressed by this decision is related precisely to co-ordination among countries in the face of challenging situations, discussed in the following excerpt from the decision:

> Inconsistent or confusing communication with the public and stakeholders such as healthcare professionals can have a negative impact on the effectiveness of the response from a public health perspective as well as on economic operators. The coordination of the response within the HSC [Health Security Committee], assisted by relevant subgroups, should, therefore, encompass rapid information exchange concerning communication messages and strategies and addressing communication challenges with a view to coordinating risk and crisis communication, based on robust and independent evaluation of public health risks, to be adapted to national needs and circumstances.
>
> (EU/D/61, 2013: 4)

As the extract illustrates, Decision 1082 emphasises communication as a key element for co-ordination and identifies the relevant body that should become the authority in the event of emergency, the HSC.

Serving as a quite different example is the co-ordination within the EMRO region. One of the regional subdivisions of the WHO, this region, with its main headquarters in Cairo, includes North Africa (apart from Libya) and the Middle East. This situation already makes WHO EMRO's role as a co-ordinating body more complicated than the EU equivalent. Political infrastructure for such co-ordination is absent. The lack of a tradition of legal infrastructure for region-level collaboration plays a very relevant role as a hindrance to co-ordination among the countries EMRO covers and even internally to the countries themselves. The issue has not gone unnoticed. Indeed, the summary report from an EMRO meeting on influenza at the human–animal interface lists among its conclusions that 'most countries in the Region do not have mechanisms for routine collaboration between the different ministries concerned for the control of influenza and other zoonotic diseases' (EMRO-EGY/D/181, 2013: 3). The report expands on this by stating

that inter-sector collaboration took place in response to specific emergencies, pointing out the lack of pre-established networks such as those cited in other examples above.

The EU and EMRO examples point to one of the most commonplace problems in the implementation of global governance systems. Co-ordination is one of the core capacities under the IHR, which are supposed to be implemented by all signatory countries; however, the enabling infrastructure for this – and other core capacities – is not equally present in all IHR states parties. Those regions and countries without the political tradition, resources and infrastructure to implement the core capacities are subjected to greater stress. In other words, they are much closer to representing a threat area, where biological threats can more easily start spreading. The issue is not purely one of capacities either. As Nikolas Rose and Carlos Novas (2005) have pointed out, biosocial movements around a specific biological object are not identical around the globe: AIDS communities in sub-Saharan Africa are quite different from AIDS communities in Paris, San Francisco, or London. Irrespective of attempts by 'global health' to make the fight against pandemic threats a unitary project, the ways in which countries and actors are able to come together differ from place to place.

5.2.3 SHARING AGREEMENTS

Sharing agreements are aimed at specifying what sort of valuable material should be shared among the parties to the agreement. This can encompass the sharing of knowledge, information, and/or samples. The objectives are varied and may include building trust, supporting a common response, and developing more efficient countermeasures.

For example, one of the key strategies under the BWC is establishment of sharing agreements in order to build confidence among states parties. In the context of the BWC, these are identified as CBMs. There are several layers involved, however. As explained to me by a researcher active in BWC enforcement (UK/I/3, 2016), firstly there is sharing among governments. The agreement delineates what kind of information is to be shared with the others who have signed on to the convention. As is so often the case with international agreements, the extent to which the sharing occurs is left to the countries to decide. Furthermore, the sharing of that information does not necessarily extend to the public. Here, there are building blocks for a boundary between those with and without expertise or the capacity to handle knowledge. Nonetheless, some countries are choosing to make BWC-relevant information public. This, according to the researcher I interviewed, is 'a very useful step, and more of them should certainly be encouraged to do so because civil-society oversight provides another layer of accountability that I think is important

when you do this sort of classified biodefence-related research that borders on the offensive/defensive' (UK/I/3, 2016: 69). This is a tool that prevents rather than prepares but still functions as a networking process aimed at creating trust, essential for co-ordinated actions.

Another field of sharing is the detection of ongoing epidemics. Even if sharing is used as a tool to strengthen collaborative networks, some deterrents rear their heads in the context of international politics. Sharing of information and knowledge during emergencies relies mostly on notification about public-health events detected through surveillance and the sharing of biological samples. Sharing of surveillance information is often problematic since reporting cases of a disease with pandemic potential can, if enough cases are detected, lead to the declaration of a PHEIC. Whilst the WHO generally does not advise the interruption of travel and trade with affected countries during a PHEIC, this consequence often does arise for an affected country after reporting (WHO/I/3, 2016). A predictable unwillingness to share information can emerge, exacerbated by activation of emergency protocols despite previous agreements.

Another important area wherein deterrents can be seen is the sharing of biological samples. The problematic element is made clear by documented cases of samples being used for the development of medical countermeasures that later get sold to the country of the samples' origin. The quintessential case is the stir that arose in 2007 when Indonesia decided to stop sharing samples after the WHO acknowledged that pharmaceutical companies had, without paying any compensation, used a sample shared among the members of the Global Influenza Surveillance Network (GISN)[41]. Such use resulted in patented products that were economically inaccessible to many countries, Indonesia among them. Indonesia pointed out how this exposed inequities in the sharing of influenza samples (Fidler, 2008). The incident illustrates a common phenomenon: sharing agreements, as they often work in a top-down way, often run into lack of engagement from a portion of their membership that stems from lack of incentive to follow them (Kupferschmidt, 2015).

5.2.4 DISTRIBUTION OF RESPONSIBILITY

The mechanism of distributing responsibility is aimed at avoiding overlap of efforts. In contrast to the types of co-ordinating activity discussed above, this is designed for avoiding repetition rather than for promoting identical response. It is rooted in one of the key imaginaries associated with biological emergencies: they have potential to disrupt the functioning of society, create chaos, or even spread terror in the case of bioterrorism (EU/D/48, 2007). Therefore, distributing tasks well in advance is perceived as good practice for keeping things under control during emergencies. One of my informants

[41] A WHO-promoted global information- and sample-sharing network now known as the Global Influenza Surveillance and Response System (GISRS).

pointed out two distinct ways that responsibility is addressed from a bureaucratic perspective: 1) as distributed via policies and strategies and simultaneously 2) as distributed through regulations and laws (EU/I/2, 2014). The main objective with the first category of distribution is to provide a set of key principles to guide practices. These are not binding, however, which makes them easy to develop but hard to implement. On the other hand, while agreeing on a certain strategy or policy is not such a difficult task, enrolling the various important actors via laws and regulation makes for huge challenges to distribution. Having everyone 'on board' for a binding regulation requires much more effort, since the distribution of responsibility is less flexible and hence can provoke clashes related to international rules vs. national sovereignty.

A good example of implementation is the application of the general EU principle for preparedness, under which ultimate responsibility and decision capacity always rests with the MS. In the words of one national health officer, countries in the EU are required just to 'take care of their business' and, then, 'notify others' (FI/I/2, 2015: 32). One of the effects of this is that those countries lacking resources to be sufficiently prepared may relate differently to that responsibility. Accordingly, while responsibility relations might have been established, these cannot always be fulfilled. The reality at the WHO level is similar:

> I think that WHO cannot play the role [of] the health police, or – how would you say? – because it's a question always of the mandate and the authority, and, of course, the [one] responsible for the health of the people is the country itself, by definition, and, as you know, there are some events… Again, I don't mean to mention as example any country, but you know that because outbreak epidemics or disease[s] have great implications [for] tourism, [for] trade, sell your poultry, sell your chicken; if you have avian influenza, you might not be able to sell it or whatever. Examples are many, many, so the sensitivity, [on] the other side, is that the country might not, let's say, be so proactive to be early, you know, to ring the bell.
>
> (WHO/I/3, 2016: 46)

This brings to the fore the issue of mandate. No matter how much initiative international organisations take, responsibility remains at the national level, where internal and regional responsibility too must be distributed. The issues of distributing regional responsibility at the national level are somewhat different. While capacities are either homogeneous over the various parts of the national territory or centralised, the possibilities for overlap are greater. Also, the need to engage the private sector, both at the level of care and at that of developing countermeasures, proves to be extremely challenging since these

players tend to not be covered by the net of biopreparedness regulations. This issue of responsibility is related to one of the main challenges highlighted in discussions of implementation processes: accountability distributed throughout governance networks is hard to apprehend and evaluate (DeGroff & Cargo, 2009).

5.3 STAND-BY PRACTICES

The mechanisms described above are mostly organisational. However, stand-by networks do more than enact pandemics organisationally. They also make possible material arrangements in the form of stand-by **practices**. These result from the productive relations and interactions discussed in the previous section. As Novas (2008: 137) has pointed out in the context of biosociality, the interesting thing about practices is that 'they provide a means of accounting for similarity and difference'. In other words, they allow us to identify and recognise the practical patterns – just as well as broken patterns – that extend throughout stand-by networks.

More concretely, stand-by practices can be understood as a subset of preparedness practices. In other words, while not all preparedness practices are stand-by, all stand-by practices are part of preparedness. In Chapter 2, I spoke of practices such as calculation, imagination, and performance as practices that have helped to develop and establish the identity and characteristics of upcoming threats (Anderson, 2010). **The temporal boundary makes stand-by practices a specific kind of activity. They are designed and implemented with an emphasis on future uncertain events.** The actualisation of the pandemic threat becomes a sort of pictorial vanishing point: all lines point towards the pandemic event, which always vanishes where those lines converge. While calculation, imagination, and performance practices work towards determining the location and identity of the vanishing point, stand-by practices work with a virtual point that has been established **through** calculation, imagination, and performance. In the material, this point was often referred to with the term 'planning assumptions' (UK/D/146, 2011). For example, this role is visible in the creation of a UK influenza-pandemic preparedness strategy. Through the establishment of 'planning assumptions' as a vanishing point to direct the virtual individuations of preparedness, uncertainty is battled. There is now a direction, future, or event towards which stand-by practices are guided:

> Planning assumptions are not a prediction of what could happen. A lesson learned from the H1N1 (2009) influenza pandemic was that calling the planning assumptions 'reasonable' was not well understood. Many people wrongly thought that it meant this was the likely scenario as no indication was given of how unlikely it was that this scenario would be exceeded.

> Planning assumptions can be informed by evidence from the past and analytical work but there will inevitably be an element of judgement. There is no 'right answer' and even experts may disagree on the 'reasonable' levels for planning.
>
> (UK/D/146, 2011: 14)

As this excerpt from the UK influenza-pandemic strategy shows, planning assumptions can be a source of misunderstanding. Although they delineate a strategy and the actions to be taken before an outbreak, they do not necessarily represent the most likely scenario. Still, the stand-by practices to be employed in preparing for such a scenario are going to engage with the scenario envisioned, even if the scenario ultimately realised is a different one.

Planning assumptions proceed from the actual and create possible futures for which it is worth planning. They can be characterised precisely as a result of the shift from probabilistic to possibilistic thinking (Furedi, 2008). As the excerpt above indicates, one source of controversy arises from understanding them as actual instead of virtual, or as virtual with an embedded promise of actuality – i.e., misunderstanding the relationship between the virtual and the actual. Again, these two dimensions appear as two halves that together form the real. Therefore, there is a line to be drawn between more and less valuable virtualisations of upcoming threats. In consequence of this uncertainty, society must prepare for anything imaginable. Even fictional narratives play a role in defining what the upcoming threat might be (de Goede, 2008; Elbe et al., 2014). In any case, the extract indicates a certain awareness of the virtual/actual divide among planners, though it distances potential confusion, situating misunderstandings about workings along those dimensions elsewhere.

Next, I will consider three specific types of stand-by practices to give a sense of what stand-by governance looks like closer to the ground. These are stockpiling of medical countermeasures, training of specialist personnel, and drafting of planning and protocols.

5.3.1 STAND-BY EQUIPMENT: STOCKPILING

I have mentioned that stand-by practices have a sociomaterial dimension. One of the cases in which this dimension becomes most visible is the stockpiling of material that may be useful for dealing with upcoming pandemics. This practice very clearly illustrates the highly concrete impact that the implementation of policies dealing with future uncertain events can have on the present. Said impact is visible in the storage of medicines, vaccines, and personal protective equipment (PPE). Although access to specifics of procedures, quantities, and locations was deemed a sensitive matter, with

security concerns being cited for no precise description ever being given, the practice seemed to be definitely widespread in its material replication at the national level. At international level, stockpiling took a more virtual shape, as illustrated in Section 5.1's example of the JPA. The centrality of this activity is made manifested in fetishising of some of the stockpiled objects, as has been noted by Polly Pallister-Wilkins (2016), who shows how certain stockpiled objects end up with the aspect of 'magic bullets' against any upcoming health threat. This, she argues, often results in neglecting of wider structural issues.

The impact of stockpiling extends beyond the material to the economic: the stockpiling of medical countermeasures usually entails hefty monetary investments from the public sector. These are often questionable in some respects, as pharmaceutical companies reap great benefits from this practice. The situation is rendered more acute by divergences of threat virtualisations between the public and the private sector. For example, in reporting on the implementation of CBRN preparedness, one EU report discusses the difficulties of engaging both the private and the public sector in the process of stockpiling and those of aligning their different priorities:

> The development and testing of a vaccine is very expensive and time consuming. The capacity simply cannot be built up within weeks or months. Additionally, capacity building is not with Member States alone – the private sector plays an essential role in bio-research. If there is no market for it, private industry will not do it and will not keep their facilities on hold expecting a biological crisis situation to develop.
>
> (EU/D/55, 2009: 56)

From this, we can see how the narratives health organisations build about private companies can deviate from their narratives about themselves. With the two perceived as divergent in purpose, private–public relations are consigned to the periphery of the expert assemblage, an area closer to the boundary with uncontrolled. While public interest remains with fighting biothreats, the private domain is depicted as focused on production and profit. This highlights the necessity of public organisms enrolling often uninterested actors in the daily performativity of security (de Goede et al., 2014). The differences are expressed through the deployment of several virtual individuations: the futures imagined by the EU, its members, and private companies differ in their constructions of certain events[42]. Still, this complex social configuration needs to be translated into one specific policy action that carries over into specific practices. For the EC, the objective is to build a capacity that is as close to the imagined virtuality as possible, congruent with the planning assumptions. This entails enlisting other actors in pursuit of the

[42] The conversation between Filippa Lentzos and Jacob Thorup Cohn (2014) is an interesting conversation on the ways in which private–public partnerships are made productive from a private company's perspective.

objectives set for the stockpiling project. The report on CBRN preparedness implementation continues by discussing the possibility of building a working group focused on bringing disparate virtual individuations together in the form of stand-by policies through collaboration:

> An EU level working group composed of public and private sector experts should be constituted to consider the possibilities to a) establish therapeutics and [a] vaccine stockpile towards the known threat of biological agents and toxins, and determine the necessary auxiliary medical supplies to stockpile (gloves, masks, syringes, etc.); b) establish a standby capacity to produce therapeutics, including vaccines, and c) establish sustained funding for a technology platform to secure countermeasures towards biological agents and toxins that are unknown today.
>
> (EU/D/55, 2009: 57)

This excerpt describes a virtual narrative that, in contrast against the one illustrated earlier, constructs a specific future characterised via shared understanding between public and private entities. This involves collaboration aimed at creating a situation in which the private market is able and willing to respond to a wide range of biological threats with the right countermeasures and in accordance with the needs identified by the public sector with regard to a given population. The interaction between potentially affected countries and private industry is planned beforehand. The organisational counterpart of these arrangements is the JPA, discussed above in connection with stand-by networks. This voluntary agreement for members of the EU establishes procedures to negotiate the collective purchase of medical countermeasure in the event of biological emergency.

All these preparations are carried out with the final objective of staying on stand-by, waiting for the right moment for activation. That is one of the key steps presented in WHO guidelines to be followed in the event of biological attacks: 'if stockpiles of antibiotics or vaccines have been prepared or identified, plans for their distribution must be activated' (WHO/D/3, 2004: 74). The word 'activation' reflects the stand-by nature of stockpiling very well. Plans need to be drafted not only for accumulation of countermeasures but also for their efficient use. This was one of the main controversies during the 2009 H1N1 pandemic, when purchasing of medical countermeasures amid panic led to massive-scale acquisition of medical countermeasures by some countries, with most of those countermeasures remaining unused and with doubt being cast on the effects and efficacy of others (Fuyuno, 2007; Jack, 2014; Lakoff, 2015b; Vogel, 2015). The latter situation shows how a stand-by practice can be successful in its earlier stages (the act of stockpiling worked well enough) but a failure when activated – or in light of lack of activation.

5.3.2 STAND-BY PERSONNEL: TRAINING OF SPECIALIST UNITS

Similar logics are followed in preparation of personnel able to work appropriately in emergency situations. Knowledge is distributed to specific groups of people who are then in charge of applying it once a pandemic event is identified and declared. Some of that knowledge is practically bound up with the stockpiled materials discussed above, in that having personnel with the ability to use these correctly is as important as stockpiling itself. This excerpt from a WHO document on the public-health response to biological and chemical weapons links training and stockpiling as practices with a dependency relationship:

> The use of biological and chemical protective equipment requires special training, and the adaptation of existing procedures for emergency management. Without careful development of the necessary procedures and intensive training, the introduction of such equipment can hamper the ability to respond, and can even be dangerous.
>
> (WHO/D/3, 2004: 62)

Thus, for the WHO, training and stockpiling of equipment depend on each other, and both are described as necessary for successful preparedness. Their activation is simultaneous. However, this sort of 'knowledge stockpiling' brings in several additional difficulties. When special units are put in stand-by mode, they have training and they exist organisationally at that moment, but they are not in action between declared emergencies. The document continues by describing various issues related to this – it is not enough for specialists to be trained and then, upon confirmation of an event as a biological emergency, activated:

> The danger of making the response to biological and chemical incidents the task solely of dedicated specialized response units is that the relative infrequency of call-out could lead to the deterioration of skills. More seriously, excessive centralization may risk increasing the time taken to react. Mobilization of a specialized biological and chemical unit throughout a region can never match the 24-hour availability and general emergency-management experience of existing response and public health services.
>
> (WHO/D/3, 2004: 57)

Here, a perennial problem is highlighted: it is not easy to keep these skills on stand-by. When not used, they can easily deteriorate. Also, such specialised units cannot be kept fully available. One could put it another way: knowledge and know-how cannot be easily stored, as they do not have a 'best before' date as drugs have. In attempts to resolve this issue, constant training and regular drills have been identified as essential (see the documents EU/D/51, 2008; EU/D/52, 2009; WHO/D/8, 2006). This emphasis on exercises was stressed by one of the EU interviewees, an expert on health threats and among those

people with implied responsibility for developing a more co-ordinated approach across the EU:

> These [simulations] are very, let's say, good instruments to test and to drill [in] the capacity at EU level, if not to [act] as a fire brigade: [...] if nothing happens, they are not sleeping. They are training themselves, simulating; they are doing exercises.
>
> (EU/I/1, 2014: 24)

In practice, the training of specialist personnel, besides being subject to the issue of matching vs. not suiting a particular individuation of happenings, needs to address problems such as possible degradation of knowledge and skills. These examples clearly display the practical dimension of preparedness. When events are not actualised, special responders must be constantly rehearsing for that actualisation and ready to face the threat that has been virtually identified and defined.

5.3.3 STAND-BY ACTION: A NEVER-ENDING CYCLE OF PLANNING

The final practice I will discuss here, drafting of research plans and protocols, is perhaps less visible, because of its lack of an outright material dimension. While the status of these materials as documents has an organisational dimension, their drafting is described in the material in quite practical terms. It too followed the preparation/activation logics. Furthermore, these documents make more visible the continuity between emergencies and how pandemic threats are configured as a generic biothreat (Lakoff, 2008). This comes about through showing that planning does not take place just prior to pandemic events; it actually follows simulation exercises and real events. The process can, therefore, be understood as an iterative one wherein the expected reality gets refined in every round. Through its iterative approach, the planning helps to address future threats better. The process becomes a loop whereby plans and protocols are tested and refined in a 'never-ending cycle of planning'. Those were the words used by a Spanish emergency planner I interviewed who characterised evaluation as a key element. After application of a plan, it is carried out to ascertain whether the plan has been applied correctly, and then the plan is updated to address possible mistakes or shortcomings:

> Usually after every exercise or real situation, we do what is usually called 'lessons learnt', and in lessons learnt what we do is rewind the whole process to see if it has been executed well at all levels, if the decisions have been well taken, if the processes and the protocols have been applied, if the material used is the appropriate one, and there we redo

> again the whole sequence from the beginning for the next situation. In other words, it is a never-ending cycle of planning.
>
> (SP/I/2, 2015: 76, translated by the author)

Through the 'lessons learnt' process (which I discuss further in Chapter 6 as a part of knowledge production), plans are updated in accordance with the events of the near past. Those events are 'redone' in that they are turned into a virtuality based on the past that is useful in establishing plans for future events. The near-past events now play a part in defining future ones and thereby allow for the construction of new virtualisations, which assist in keeping uncertain biological threats at the centre of the preparedness process even after an actualisation.

Even while past events, with their specificities, play a key role in shaping plans for future events, the same Spanish officer emphasised the relevance of keeping those plans adaptable. Indeed, via development of plans that do not take final steps towards the specificity of the threat, plans remain open and flexible, narratives are kept from being stabilised, and the vanishing point of the lines of preparedness retains multiplicity. As Caduff (2015) has stated, the value of plans is not in the plans themselves so much as in the planning process. There is inherent value in the process of updating plans and of crafting generic versions. This is true even for numerous iterations: plans are not necessarily a new thing, and generic plans for threats that are regarded as similar – e.g., haemorrhagic fevers and Ebola or respiratory syndromes and flu – have existed for years in Spain, for example:

> With Ebola in Spain, there has existed for many years- I think the first version is from the year '98 or '99. There is a response plan in front of haemorrhagic fevers that obviously include Ebola. This plan was updated in 2002; it was updated in 2013; and now, obviously, what has been done is [that], based in that common plan, there have been specifications made for Ebola, adapting it to the current situation. We have many documents, many procedures and protocols, up to an extent generic, but, for example, the flu protocol is very adaptive to any respiratory disease of respiratory transmission [that is] highly acute, to say it like that, and those protocols can be adapted very easily to specific situations.
>
> (SP/I/1, 2015: 51, translated by the author)

This description illustrates that, whatever the ideal need for the plans and protocols to remain open-ended, there is continuous specification of possible ends. In other words, in parallel with the generic work there is a series of planning assumptions that direct the preparation of plans and protocols. The Ebola protocol was part of a wider protocol for haemorrhagic fevers that became more specific in the face of an actual emergency. Therefore, in the

course of attempting to make them fit specific situations, constant updates are a must, especially right before activation.

Besides the ties that connect plans with specific threats, there are other elements that condition the efficiency of planning, especially when the plans are turned into action. Today's political and economic systems are a possible element of conflict over implementation of plans. One clear example was offered by WHO Director-General Margaret Chan. She described a situation wherein, notwithstanding all the efforts and plans to deliver vaccines to developing countries in response to H1N1, systemic difficulties such as 'the lack of harmonization of registration for medicines and vaccines, issues of liability that are part of company policies, [...] the simple fact that no country is willing to give up its sovereign right to authorize the marketing of a medical product', and 'issues surrounding the cold chain' made it impossible for vaccines to arrive in good time. According to Chan, 'no amount of advance planning is going to change this reality or alter the way the systems work' (WHO/D/14, 2011). Here, the virtual plans for vaccine delivery butted up against the actuality of local context and regulation and the materiality of the cold chain, hampering the actualisation of the virtual individuations designed by WHO planning. Those obstacles signal the temporal limitations of stand-by plans and protocols, forcing them to be constantly updated. With both real-world events and simulations revealing the gaps and holes in those plans, the plans fail to become stabilised.

5.4 NEED FOR KNOWLEDGE

This chapter has shown how preparedness plays out in a constant struggle to govern a temporal challenge and to deal with the difficulties of planning for a threat that is not yet identified. In it, I have discussed examples of specific mechanisms that 'find their way', maintaining their footing while on a slippery slope where the threat is simultaneously defined and undefined (a summary of those mechanisms is presented in Table 6). The networks and practices presented in this chapter operate in consideration of such instability but also are themselves key in defining the identity of expert assemblages. Indeed, all actors enrolled in the stand-by mechanisms, whether between emergencies or during one, become part of both the expert and the vulnerable assemblages; they are woven into the infrastructure that keeps society from the disruption that Massumi (2005b) described as the source of fear. This infrastructure needs protection to the point of much of its content being protected as 'classified'. Whilst what I have discussed here is public knowledge, the path to learning it featured also more than one door that would remain closed to my questions. As a researcher, I was allowed to get close as I formed my empirical assemblage and was able to examine how society is to be protected, yet I was

not allowed to engage with those parts. Although what I could access helped to illuminate the gaps sufficiently for my purposes, they were a necessary reminder that I was always a partial member with limited access to the knowledge the expert assemblage produced.

Table 6: *Summary of stand-by mechanisms and practices*

Dimension		Object/scope	Limitations/challenges
Mechanisms	Co-ordination	Ensuring similarity of practices	Suits bureaucratic systems and demands legal infrastructure
	Sharing	Providing information and samples	Is hard to enforce and police and has inequalities in feedback and returns
	Responsibility	Avoiding duplication of practices	Faces issues of policy/ strategies vs. law/ regulations: issues of mandate, sovereignty, and the private sector
Practices	Stockpiling	Supplying material resources	Has issues of fetishising of magic bullets, economic impact, and expiry dates
	Training	Supplying human resources	Entails issues of skill deterioration and of harmonisation between regular and special corps
	Planning	Specifying protocols and future actions	Is a never-ending cycle and requires balance between flexibility and concreteness

My preparations for possible occurrences in the lead-up to the Egyptian revolution anniversary and on that day itself were less complex, but similar logics applied. In Egypt, I was constantly looking for two things. I was seeking knowledge about what would happen and was happening, and I was constantly trying to ascertain what sources were credible as providers of knowledge from my perspective: my friends and colleagues or perhaps government statements? Also, I wondered what to think about news sources or state-run media sources. Could I trust what people were reporting on Twitter?

This chapter has highlighted two further issues that dovetail with the latter concerns. Both give impetus to how I continue this dissertation with the next chapter. The first is **the constant struggle with not having the knowledge necessary for formulating specific enough plans**. Among the most powerful mechanisms of the expert preparedness assemblage is its ability to produce knowledge (MacPhail, 2014), yet stand-by networks are government apparatuses that **await** knowledge until they can unleash their

governmental power. Here we have a powerful governance apparatus that is only waiting for knowledge. This device becomes active only upon a sign of actualisation of one of the constructed virtualities. Then the knowledge-making machinery that is pandemic research is released from its default state, of being at minimal activity until picking up a signal.

The second issue is related to **the definition of an authoritative source for the knowledge needed, the demarcation of a community and members thereof that can contribute to filling in the gaps that are required for stand-by networks' operation**. Certainly, membership is a central piece of the stand-by network. The ability to produce, access, and handle useful knowledge is what defines membership. The process of delimiting the communities that can become part of the expert assemblage, produce relevant knowledge, and make that knowledge productive is the meat of the following chapter.

A few words of orientation can be noted here, from the work of Novas (2008), who stated that access to certain practices and infrastructures is used to both include and exclude actors from certain circles. The construction of an expert community is part of the biosocial processes that grow out of the emerging of new threatening forms of life. Identities and social capital are assigned as results of these motions. They help to divide between what is internal to the governmental apparatus and what is not. I take this matter up directly in the next chapter by looking at various knowledge-making and knowledge-distributing mechanisms that result in establishment of expert communities with the authority to inform pandemic events and the available responses. Thereby, these define the expert, the vulnerable, and the threatening.

6 PRODUCING KNOWLEDGE, PRODUCING COMMUNITIES

> *I'm still trying to get the hang of the interpretation system as the meeting starts. The chair introduces the meeting. Then I lose the English audio channel and don't understand anything. When I find the proper channel, the Russian representative is speaking in the name of the Russian delegation, asking to set up some drafting committee. Word goes back to the chair. He wants to attend to item 3 before addressing the proposal of the Russian delegation. When he gets back to the proposal, he says that he cannot accept the proposal himself and yields to assessments by other delegations. The US representative asks for the floor and requests that the chairman take the decision. I have difficulties in following who is speaking: if one misses the introduction by the chair – who is in charge of identifying whose turn it is to speak – it's impossible to tell who is speaking unless one knows the person, perhaps the accent.*
>
> *BWC Diaries, 14th December 2015*

My first ten minutes at the BWC states parties meeting felt like an action movie, no matter that I was sitting in a chair and interacted with only an earpiece and with a channel selector that allowed me to listen to any of the individual languages available. Even if I had been certain that no-one was aware of my clumsy interactions with the channel selector, I would rarely ever have felt so out of place. This feeling stuck with me in every interaction. It remained at lunch, during side events, and on breaks. I was clearly not a member of the BWC community. I met people with quite varied backgrounds, from diplomats to medical doctors, from microbiologists to NGO workers and academics. Irrespective of their different origins, they had something in common: they seemed to know what would happen next, and they seemed to know how to behave. And, most importantly, they were able to contribute to the discussions, to reaching new (or, often, old) conclusions on the banning of biological weapons – or, rather, on regulation of the potentialities of these. They gave speeches, handed out flyers, organised side events, promoted reports, and encouraged new research. Furthermore, they had access to the knowledge contributed by their peers. They formed a community with a specific culture (Knorr-Cetina, 1999) and specific knowledge (Haas, 1989; 1992). Some of that knowledge was available to outsiders such as I, and some was not. I was, for example, asked to leave at a certain point in the meeting. Communities such as the BWC one and others I will discuss in this chapter are in charge of informing the mechanisms that I presented in the previous

chapter, for determining how a biological threat is to be defined and identified, how to respond to it, and how to regulate access to information and knowledge.

Developing the previous chapter prepared me to formulate two questions related to knowledge and the identification of expert communities. The first one refers to the demand for new knowledge of stand-by mechanisms. The second involves how an authoritative source for that knowledge gets delimited. Certain communities of experts play a greater or lesser role in contributing to that knowledge, but what determines the extent of the roles? Just as the knowledge produced by each such community is only partial, so too is the membership of those that are part of them. How they come to be deemed experts to rely on is not without struggle. Indeed, as MacPhail (2014) has shown in the context of pandemic influenza, there is constant manoeuvring to establish the significance and the veracity of new knowledge about upcoming pandemic threats. While the recognised scientific community has reached agreement on the need to gather data about viruses and diseases, the interpretation and significance of said data is hotly debated. MacPhail identifies two academic stances on this issue. The orthodox position, so named for its normative status, would take the resulting knowledge as a tool to foretell inevitable pandemics. The heretic position would hold that knowledge about viruses is useful but has no capability for prophetic conclusions. Adherents to this stance maintain that pandemic hazards cannot be foretold through the use of microbiological research. According to MacPhail, taking the latter position usually involves a betrayal of the norm, with researchers who defend this stance being discredited by their peers in many cases. This division is key to understanding how knowledge is produced in the context of pandemic threats: to be acceptable, the knowledge should be applicable to strengthen the normative position. More importantly, though, it shows that production of knowledge about pandemic threats entails navigation in which both the knowledge itself and the position of authority are constantly challenged.

In MacPhail's understanding of pandemic research, pandemic knowledge and its significance are always in the making. As I mentioned above, many communities are involved, and they all have something to say. As has been argued to be the case with other scientific disciplines (Abraham, 1993), the global public-health field's knowledge-making practices are multiple and fractal. Indeed, the participating communities contribute to constructing pandemic threats as multiplicities that are shaped at several levels, from positions that differ in their information and knowledges. Important in these dynamics is that not all of them are as loud or have the same decision capacity. More importantly, those communities do not even all talk with each other or have access to the same information, data, or sources. Given that, as noted above, the knowledge-making mechanisms tend to designate certain knowledges as normative and, therefore, more authoritative. The preparedness apparatus is 'stubborn' and tends to favour pre-approved sites

and methods, irrespective of the multiplicity of knowledge. In particular, scientific and institutional knowledges prevail.

In this chapter, **I discuss knowledge-making and knowledge-distribution practices that contribute to the production of that normative (along with less normative) knowledge and to the delimitation of the boundaries around authoritative communities**. Such practices draw a line that separates 'proper' knowledge and 'proper' subjects of knowing from knowledge and subjects that, by not falling in line with the normative view, are rendered either not useful or even dangerous and controversial. The 'improper' knowledge and subjects that get produced are made into others with limited capacity to understand and/or affect emergency situations. Nevertheless, they are not completely shut out. In fact, the marginalised knowledges and subjects are key in constructing normativity by providing an exteriority that helps to define the knowledge-making apparatus.

The chapter is divided into four main sections. In the first, I discuss some literature underpinned by the concept of epistemic communities (Haas, 1989; 1992; Ruggie, 1975). That concept offers an initial frame for understanding how expert communities might be constructed as an authority on certain policy issues. The second and third sections use excerpts from the empirical material to look at knowledge-making and knowledge-distribution practices that appear to be at the boundaries of the global health apparatus and thereby indicate how the boundaries of those communities come to be more or less stabilised. In the final section, I expand on the relevance of exteriority and otherness for the construction of the pandemic expert community. A more-than-human understanding of the expert and other configurations renders them assemblages instead of communities. In addition, the communities are often imagined, in a process that is commonly replicated in the construction of the science/public divide (Rommetveit & Wynne, 2017).

6.1 EPISTEMIC COMMUNITIES

In the lead-in to this chapter, I discussed how the various people attending the BWC meeting showed difference and homogeneity at the same time. This was evident also from the interviews and documents: multiple types of expertise were brought together to form a sort of pandemic expertise – an approachable corpus of knowledge linked to global biological threats. Indeed, as W. Anderson (2014) has pointed out, the rise of concerns about global health as a concern is embedded in wider historical, political, and academic debates that configure it as a plausible object of knowledge. In the case of pandemic threats, that plausible object of knowledge is the biological threat and its consequences once it gets actualised. The establishment of biological threats as an area of expertise is made visible by the emergence of international agreements and initiatives – e.g., the IHR or the intensification of BWC activities over the last decade – and by the increase in funding related to biosecurity and bioterrorism

(Caduff, 2015). The knowledge-making initiatives around pandemic knowledge have grown numerous enough to form, I argue, an expert community in its own right or, using the concept brought to prominence by Peter M. Haas (1989; 1992), an epistemic community. In this section, I discuss the utility of the concept of epistemic community to refer to the knowledge machinery of preparedness and the various actors that participate with it.

The concept of epistemic community is rooted in the work of John Gerard Ruggie (1975). His use of the notion remained secondary to his interest in international regimes. For him, the institutionalisation of science and technology occurs at three levels: epistemic communities, international regimes, and international organisations. While he describes the first as 'purely cognitive' (Ruggie, 1975: 569), such a reductionist description does not do justice to his conceptualisation. Indeed, he draws on Foucault's (2002) concept of **episteme**[43] to 'refer to a dominant way of looking at social reality, a set of shared symbols and predictability of intention' (Ruggie, 1975: 569–570). For Ruggie, this dominant manner refers to the configuration of the members of the community, which plays a key role as they very often put forward 'a proper construction of social reality' (Ruggie, 1975: 570). In this, epistemic communities share not only knowledge but also a specific worldview and a way of constructing it. Ruggie's conceptualisation goes beyond cognitive understandings of expert scientific and technical communities to look at them as interacting collectives. With regard to expertise in pandemic preparedness, knowledge follows a certain episteme that is represented by the logics of anticipation I discussed in Chapter 2. That use of a knowledge system that offers possibilities for the production and distribution of knowledge helps to delimit the expert communities in the fight against pandemic threats.

While Ruggie provided the name and the background, it is with Haas (1989; 1992) that the concept became more complex and useful. He took it further, to consider not only the function and raison d'être of epistemic communities but also how they come to be, gain relevance, and exert an influence on political decision-making. For Haas, epistemic communities are networks of 'professionals with recognized expertise and competence in a particular domain and an authoritative claim to policy-relevant knowledge within the domain or issue-area' (Haas, 1992: 3). They may encompass professionals from a host of disciplines and backgrounds who nevertheless share certain normative, principled and causal beliefs, subscribe to certain common notions of validity, and engage in a common policy enterprise. The existence of these communities causes the relevant information that informs policy-making to

[43] Foucault's conceptualisation of episteme in *The Order of Things* (Foucault, 2002) refers to systems of knowledge construction that occupy specific times, spaces, and cultures. Epistemes, for Foucault, define plausible objects of knowledge and valid ways of producing it.

be cast as neither guesses nor raw data but 'the product of human interpretations of social and physical phenomena' (Haas, 1992: 4).

Haas begins by describing a world of international relations where the line between decision-makers and specialists is clearly marked. Since these two communities are seemingly independent, policy-makers can justifiably turn to specialist communities for advice, especially in times of crisis. However, this division is not a permanent one. Haas characterises its motion in terms of institutionalisation of expertise via a given epistemic community's usual process of 'political infiltration' (Haas, 1992: 27). He sees this as cultivating the conditions for broader acceptance of the beliefs and ideas that give shape to the epistemic community in question.

The idea of political infiltration is of especial relevance in the fight against pandemic threats. Many of the people working in the institutions, drafting plans and agreements, and later implementing them have vast experience as medical doctors or microbiological researchers. This has blurred the boundary between policy-makers and health experts. Specialists have become decision-makers themselves by becoming embedded in the organisations that they advise. The crisis that, according to Haas, pushes decision-makers to turn to epistemic communities becomes a permanent one, always present within institutions on account of the turn to preparedness. In other words, the institutions do not need to rely on outside expertise, since experts are part of those institutions. This seems to be a logical consequence of preparedness logics: if threat is constant, so too must consultation be, resulting in the permanent incorporation of expertise into governmental apparatuses.

Haas's description of epistemic communities is useful but in need of expansion in certain respects. Over the years, it has been nuanced by other authors accordingly. Firstly, epistemic communities have started to be conceptualised in broader terms such that they are seen not as merely groups of scientific and technical experts that inform governments but as also including non-governmental and international organisations, multinational corporations, and advocacy coalitions (Davis Cross, 2012). A second interesting addition has been a focus on practices (Adler, 2008; Adler & Pouliot, 2011). Emmanuel Adler and Vincent Pouliot claim that epistemic communities do not result from the sharing of knowledge, expertise, and worldviews alone; they emerge from shared practices also. Finally, Morgan Meyer and Susan Molyneux-Hodgson (2010) have suggested that Haas's conceptualisation portrays epistemic communities' emergence as linear, almost natural processes, and they posit a need for a less clear-cut depiction of how these communities come to be.

My use of the concept of epistemic community is not for purposes of singling out the relevant ones in the area of pandemic preparedness[44] or to

[44] The case of the BWC serves as an excellent example of a hybrid community that includes diverse experts more or less integrated into the political apparatus. I think my description at the start of the

specify clear limits that may serve as their boundaries. **Rather, I am interested in revealing how the production and circulation of knowledge take part in delimiting them, in drawing boundaries between normative expertise and non-normative knowledge (i.e., alternative, lay, and traditional knowledges).** To this end, I use the concept in a more dynamic sense, paying attention to broadening redefinitions; practices; and the struggles that may hamper what often appears in Haas's depiction to be the natural, freely flowing formation of epistemic communities.

That is, I draw on less restrictive conceptualisations of epistemic communities, in suggesting that epistemic communities are always transepistemic. Drawing on work by Karin Knorr-Cetina (1999), Meyer and Molyneux-Hodgson (2010) have argued that epistemic communities are transepistemic

> in that they involve scientist[s] as well as non-scientists; in that they are concerned with the political and the epistemic; and with the social and the technical. In other words, we see that the boundaries of epistemic communities are never stable, nor that they delimit an epistemic realm from other realms.
>
> (Meyer & Molyneux-Hodgson, 2010: 3.8)

In conclusion, epistemic communities are constantly being produced and do not exist merely on account of any naturally existing social collective, a specific disciplinary background, or a specific spatial location. In the field of global health, as is true of transnational science politics in general, it is especially knowledge-making and knowledge's distribution that constantly aid in constructing their boundaries.

6.2 KNOWLEDGE PRODUCTION

Some of the knowledge awaited by the stand-by apparatus is what is referred to in the empirical material as residing in 'knowledge gaps'. Indeed, narratives that address knowledge-making continuously reference a need for filling such gaps. Often the gaps are filled by summoning the power of scientific expertise. As Caduff (2015) has argued, scientifically inspired accounts of a coming plague have flooded pandemic discourse, turning it into a scientific prophecy that is highly expansive in the world of public health. The opinion of experts is

chapter offers a good example of what an epistemic community might look like in the area of pandemic preparedness. Others too could be identified: the WHO's experts and consultants; the European Union, which brings together all sorts of national actors; and the scientists and microbiologists whom are already prominent in existing literature (Caduff, 2014; MacPhail, 2014).

occasionally invoked in the material in the name of overcoming those knowledge gaps (see documents EU/D/54, 2009: 2; EU/D/55, 2009: 2; WHO/D/3, 2004: 72). This use of expertise allows making claims about knowledge gaps that have not yet been bridged, giving some sort of expert validation to the prophetic claims. In a more formal manner, expertise is applied as a way to offset a lack of more methodical approaches to knowledge-making, as this excerpt from a WHO document on risk assessment suggests:

> Once the risk assessment team has carried out the hazard, exposure and context assessments, a level of risk should be assigned. This process is called risk characterization. If there is no mathematical output from a quantitative model or comparison with a guidance value (e.g. in food safety risk assessments), the process is based on the expert opinion of the team.
>
> (WHO/D/19, 2012: 19)

Rapid risk assessment is aimed at gathering information about a certain event so that the responsible bodies can decide on the implementation of suitable response measures. For informing such decisions, usually more scientifically oriented methods are preferred – especially quantitative ones, since numbers are among the most fundamental devices in building objectivity (Rothstein, Huber, & Gaskell, 2006). These are not always available in support of certain claims or to cover certain analyses, and agreement among experts is far from being a given in most of the empirical material. For instance, in a study of expert opinions on the bioweapons threat, it is argued that experts often differ in opinion over the likelihood of a bioweapons attack, the likely agents or actors, the 'red lines' for research, and the risk of misuse of research (Boddie, Watson, Ackerman, & Gronvall, 2015). Still, claims by parties acknowledged as experts – whatever their disparity – are essential to maintaining the sense of relevance of the threat: 'given the paucity of other data, judgments about the bioweapons threat rest largely on expert opinions' (Boddie et al., 2015: 792).

My intent here is not to dismiss the utility of expert opinion with regard to pandemic threats but to point out the constant need for truth-making devices in policies and documents. 'Expert opinions' become a device that allows claims of widespread agreement when data and scientific methods are not available. As I have already mentioned, such methods are preferable to expert opinions, and the empirical material was replete with references to methods with a claimed scientific and objective nature. These techniques and practices aid in developing the stand-by machinery, helping to make threats more or less concrete. Most importantly, many of these methods and techniques afford separation of 'good' knowledge from 'bad' knowledge. In other words, these devices, expert opinion among them, help to delimit which are the normative tools that the epistemic community 'should' use. This is done partly through

the othering of methods and techniques that, for whatever reason, may not be acceptable or should have a differentiated validity status.

With the subsections below, **I discuss four ways in which the production of pandemic knowledge helps to build the biological threat and the 'proper' response normatively: epidemiological surveillance, implementation assessments and lessons learnt, microbiological research, and use of new disciplinary knowledges**. Some of these (surveillance, assessments, lessons-learnt processes, etc.) are well-established methods agreed on in the field of global health emergencies. Others, such as certain types of microbiological research, are more controversial. Still others remain largely unintegrated relative to the knowledge-making apparatus of global health, notwithstanding constant claims of their relevance, as in the case of anthropological and social scientific knowledge. These practices serve to illustrate what knowledges are relevant at the time of characterising the threat and the proper response to it. Of greater importance is their utility for designating who and what belongs to the pandemic preparedness epistemic community. As Novas (2008: 139) has argued, social practices create communities but can also be dividing; they 'can be used to exclude just as much as they can be used to include'. Hence, knowledge-making practices influence not only who and what belongs but also who and what does not.

6.2.1 FOLLOWING THE THREAT: EPIDEMIOLOGICAL SURVEILLANCE

Epidemiological surveillance, in contrast to recourse to the label 'expert', is very much focused on the accumulation of data. How data and the significance thereof are handled has undergone specific changes wrought with the turn to preparedness. Most documents depict two ways to carry out surveillance: index-based surveillance (IBS), sometimes referred to as indicator-based, and event-based surveillance (EBS). Both types of surveillance are aimed at identifying public-health events that require early warning and response – in other words, identifying those events that should activate some of the stand-by mechanisms I described in the previous chapter, perhaps including the declaration of a PHEIC. Both IBS and EBS perform a constant exercise whereby so-called epidemic intelligence is characterised as relevant or irrelevant for pandemic knowledge. However, there are significant differences in how they work and in the rationale behind them (see Table 7 for a comprehensive overview of the differences).

Table 7: *Description of indicator-based and event-based surveillance, developed on the basis of a figure from WHO/D/21, 2014: 13*

Index-based surveillance		Evidence-based surveillance	
Process	Characteristics of data	Process	Characteristics of information
- Systematic - Routine/regular - Mainly passive - Consistent in its sources	- Organised-set-based - Limited - Predetermined - Formal - Trusted and reliable - Mainly health-care-based	- Formalised - Flexible - Active - *Ad hoc* - Real-time	- Not organised - From many sources and variable - Not predefined - Both informal and formal - Of non-established reliability
Examples of IBS		Examples of EBS	
- Epidemiological surveillance - Mandatory notification - Sentinel surveillance - Syndromic surveillance - Registers - Mortality data - Laboratory data - Surveys/research		- Media - Communities - The Internet, blogs, and social networks - Informal networks - Ministries' official Web sites - Alert networks - NGOs - Private-sector entities - Animal-health bodies - Environmental-disaster workers	

IBS looks at changes in long-term trends of statistical data. It therefore offers stabilised knowledge with slow but constant and reliable flows. It is deviation from flows considered normal that triggers the alarm. For this, IBS uses already stabilised case definitions; i.e., it looks at diseases that have been catalogued by the relevant organisations and are identifiable[45]. Therefore, its contributions to knowledge are relatively modest, consisting of updating the current status of already documented diseases by adjusting indices such as incidence, morbidity, and mortality. Triage for IBS data via statistical methods enables later qualitative interpretation. In terms of reliability and acceptability of knowledge, IBS statistical analysis is seen as completely reliable, while the qualitative interpretation can sometimes be a source of bias (WHO/D/21, 2014: 24). As IBS systems are generally well-established, all information flowing into the system is considered relevant in the sense that it contributes to creating a bigger and more robust corpus. The logic is simple: the more data gathered, the more robust the resulting knowledge will be.

[45] For an account of how those catalogues and categorisations are shaped through the International Classification of Disease, see the work of Bowker and Star (2000).

The global health networks for surveillance of pandemic influenza are a clear example of IBS. Judging influenza in terms of pandemic threat has the advantage that it can be compared with its seasonal counterpart, for which data have been gathered systematically at least since the establishment of the WHO GISN in 1952 (World Health Organization, 2017). When influenza started to be considered an impending pandemic threat, towards the end of the 1990s, there was an established baseline for data comparison. Whenever influenza data do not conform to the normality of seasonal influenza, alarm bells should ring and investigation processes should be triggered.

EBS differs in rationale from IBS, with the growing relevance of EBS serving as an excellent example of the change in anticipation logics and the influence of technological innovations on global health[46]: EBS encourages following the logics of the all-hazards approach (WHO/D/21, 2014: 7), but how does it do so? It relies not on baselines but, rather, on the detection of what are known as unusual events. These are events that escape normality not statistically but in a qualitative sense. Notice of unusual events comes from sources such as mass media and online feeds, with the monitoring of these being largely an automated activity, although clinicians do play a role in detecting unknown syndromes. One of the key steps is triage, whereby duplicates and non-relevant information are discarded, drawing a line between relevant and irrelevant information. This line is often positioned on the basis of the validity associated with the source. In other words, the reliability of the data depends on the position that the source of the report occupies in the surveillance network.

An example of successful EBS can be seen in the emergence of MERS-CoV in 2013, with an unknown syndrome getting detected in Saudi Arabia. As the investigation of the sample from a victim of the disease confirmed, it was a new type of coronavirus, different from SARS. There was a call for event-based surveillance among clinicians because no databases or IBS systems encompassing this disease were available:

> As with nearly all recent emerging novel pathogens, most early cases of MERS-CoV infection will likely be detected by astute clinicians rather than through established indicator or sentinel surveillance systems. Therefore, the most effective tool in detection will be awareness among the health care providers. An effective detection system will also need to include a readily available channel by which clinicians can report suspect cases, and an effective response mechanism.
>
> (WHO/D/31, 2015: 1–2)

[46] For a discussion of the 'real-time-ness' claimed of automated surveillance and the consequences for the construction of the threat as a present-future matter, see the work of Lindsay Thomas (2014).

The figure of the 'astute clinician' who can identify certain information as relevant for contributing to the corpus of knowledge about MERS-CoV comes to the fore. Therefore, the triage procedure requires expert members of the community who can evaluate public-health events in accordance with surveillance criteria.

Both EBS and IBS are directed at early identification of public-health events. After this occurs, signals that are considered unusual or outside normal patterns are verified via gathering of biological samples and subsequent laboratory confirmation. The confirmation may arrive in terms of sameness and difference: is the sample deemed identical to a known biological agent, or is it a new one? If verification is successful, the data are used to create evidence of public-health events that may necessitate activation of the stand-by apparatus. In the face of an unknown disease detected through EBS, detection might also trigger an IBS process based on a new case definition. As knowledge produced through EBS grows, so do the chances of building a robust corpus of knowledge. Said corpus can then give way to a proper IBS system.

IBS and EBS help to shape the epistemic community that contributes to producing knowledge about pandemic emergencies. For example, IBS relies on established surveillance networks such as the GISRS, in which designated members regularly submit data. Such networks and reporting systems are not, however, implemented equally throughout the world. Therefore, the reliability of countries with less well-established national health-care systems might be lower. Meanwhile, EBS helps to shape the construction of knowledge by establishing the reliability of various sources and deciding which cases should be incorporated and which not.

6.2.2 IMPLEMENTATION ASSESSMENTS AND LESSONS LEARNT

Implementation assessments and lessons learnt (an important part of the planning process discussed in the previous chapter) inform the stand-by apparatus not to activate it but more to keep it in good shape and strengthen it. Implementation assessments and lessons-learnt work are in temporal opposition to each other in the sense that the former are directed at seeing what has been implemented before an emergency takes place while examining the lessons learnt involves evaluating the performance of the stand-by apparatus after an emergency (or a virtual simulation exercise) has taken place.

In the empirical material, assessments could be approached as either internal self-reporting or an external tool. Although there sometimes was no follow-up on the reports and their utility was not very clear to some public-health professionals – as a Finnish expert in biosecurity and biosafety stated (FI/I/1, 2015: 197–207) – sometimes they can be an essential part of the preparedness process. From a WHO perspective, this sense was perceived as prevalent in various countries. An interviewee in one of my discussions with WHO personnel described the evaluation of IHR implementation as having

been difficult to carry out. Indeed, full implementation has proved relatively tricky in quite a few countries – e.g., most countries in the EMRO region. Accordingly, assessments have become essential for reviewing IHR implementation. When talking about the self-assessment tool and its function, this informant explained to me the flaws of such tools:

> Only 33% of countries at the global level have said that they have met IHR requirements, and remember: when they say they have met, it's self-reported, so if I ask you 'are you good?', what are you supposed to say? 'I'm good', but when you do the assessment – objective, reliable, objective assessment – we did, […] Ebola gave a chance, so in Afro Region, in EMRO Region, in Euro Region, they had this self-report from countries for IHR saying 'tick', 'tick', 'tick', 'tick' [emulates ticking boxes on a survey form] and for Ebola we went and we looked at infection detection and control, we looked at surveillance, we looked [at] risk communication, we looked at co-ordination mechanism office, emergency response, we realised over 60% of the capacities were not there.
>
> (WHO/I/2, 2016: 94)

According to this informant, self-assessment is more like a box-ticking exercise without much power to create knowledge about the productivity of such implementation. These methods lack the claim to the objectivity that is attributed to external assessments. Here, the tool disqualifies the type of knowledge produced. Then, when the implementation is exposed in light of an actual event, this knowledge is revealed as unreliable.

The informant with the WHO continued by noting that countries therefore were demanding help in developing the type of knowledge desired – i.e., objective, reliable knowledge – for understanding their own systems:

> When they realise that their self-reporting self-reports were unreliable to say the least, they were very keen, they were looking to say: 'WHO, help us understand where we are; give us a true picture', and then they also want WHO and other global partners, but led by WHO, to co-ordinate the technical capacity to fill those gaps.
>
> (WHO/I/2, 2016: 94)

As the interviewee explained, countries demanded assistance in abiding by the schedules and the priorities established by the WHO. In their work to comply with external assessments, they found that the issue was one of budget in part: there was no way to calculate the implementation cost or to obtain funding for the implementation either. This has required further changes in the assessment mechanisms, whereby funding and loans for IHR implementation

are conditioned on implementation of the IHR as gauged via external assessment. This means that the knowledge-making mechanism is externalised – together with a portion of the set of national health priorities – in exchange for funding. In other words, the ability to produce knowledge about national health-care systems is not a national matter anymore; it has become an international, global one.

At the other end of the temporal axis of assessment is lessons learnt. The processing of these is part of the never-ending cycle of planning analysed in the previous chapter. Besides contributing to those loops of preparedness, these lessons play an essential role in attempts to incorporate things learnt in connection with practical experiences (whether actual or virtual) into abstract or more generic protocols. Lessons learnt can be presented in meetings, reports, or articles, all directed at understanding the failures and successes of a given response. This is a way to refine knowledge and refine the mechanisms. It has to do with taking what was thought to be known and revising it in light of an actual event. One possible result is integration of new knowledge, while some other knowledge might be dismissed.

One of the main challenges is that, even though new knowledge might be produced, it is not always incorporated into the response mechanisms. This failure to assimilate new knowledge produced via evaluation systems and lessons learnt was mentioned in several interviews. One interviewee with the WHO referred to this as 'the tragedy of preparedness' (WHO/I/2: 76), in which funds and resources for preparedness are allocated only during an emergency rather than when preparedness is supposed to be developed: before or after one. What the informant called the tragedy of preparedness is present even in Western areas. A discussion with one British interviewee specialising in emergency planning included musings about how easy it is to lose momentum after a 'real event'. Besides economic and material resources vanishing, the attention span for incorporating the lessons can evaporate:

> I think that with all emergencies, when you try and learn from them, there has always been a difficulty in implementing some of the actions. Once an emergency is over, people go back to their day jobs and, you know, this is why [in the] review process it is very important to make sure that the momentum isn't lost, but that can be quite a challenge, to keep the momentum going, to make sure that you can [actually confirm] and say 'this lesson has been learnt' and, you know, we don't do this well enough, really, and sometimes you go on to the next emergency and go 'ah, we thought this lesson had been learnt last time, but we are learning it again', so it actually didn't do that much.
>
> (UK/I/2, 2015: 93)

Lessons learnt are therefore not just a discursive element. They are highly dependent on the economic and other material resources at the disposal of a given institution. Furthermore, these lessons are not relevant in themselves;

the relevance emerges only as they become integrated with previously accumulated knowledge. This too highlights the importance of having a concrete threat in relation to which resources can be directed. For resources to flow, for preparedness to take place, the threat needs to be as concrete and as present as possible. Identifying a threat can be a key step in making the implementation of preparedness policies possible.

Both of these examples show that, while certain knowledge is produced, its use is dependent on the validity ascribed to the community (in the case of assessment) or the resources available (in the case of lessons learnt). In the first case, knowledge is produced by an unreliable source – the country – and is later dismissed as false when examined through an external assessment. In the second case, knowledge is produced successfully by the epistemic community but, for reason of lack of economic and infrastructural support to that community, is not acknowledged.

6.2.3 MICROBIOLOGICAL RESEARCH: THE RIGHT TYPE OF RESEARCH

Near the beginning of the chapter, I discussed how the scientific community can be divided into a sort of orthodox community and heretic community (MacPhail, 2014). I wish to build on that discussion to point to other ways in which 'heretic' or 'orthodox' status can be shaped, specifically with regard to microbiological research. The most important consequence is that knowledge determines the way threats are identified and the way public-health responses are planned.

Microbiological research helps to characterise a virus's transmission mechanism, lethality, and infectivity, information that can then later be used as input to the public-health response and medical countermeasures (both essential parts of the stand-by apparatus). This type of research is often sponsored, promoted, and regulated from institutional circles, so it is often entangled with socio-political assemblages that condition both the practice and the results of scientific research. Such entanglements take two distinct forms in the material analysed. On one hand, funding dynamics help certain research and certain frames to develop more swiftly through the establishment of priority lines of research. At the same time, knowledge may get designated as classified when it is considered dangerous. This not only creates discontinuities in the construction of knowledge but also imposes a normative agenda for future research.

Let us consider funding trends first. These play a very important role in the relative pace of development between research fields. Public institutions may even issue calls for research on specific topics, thereby stimulating additional production of scientific knowledge surrounding those foci. One example from

fairly early on is the boom experienced by biosecurity research at large[47] as bioterrorism became a buzzword around which funding applications in certain spheres had to be framed in the US in the first few years of the 2000s. Much of this research later was reframed in connection with avian influenza as that became the new priority in 2005. This recasting from security to health in grant-application trends played a key role in the securitisation of global health (Caduff, 2015). I can turn to my empirical material for another example of how funding trends affect knowledge-making: the 280 million euros that the EU allocated to a call for proposals aimed at boosting Ebola research (see the press release EU/D/64, 2014). This was part of a wider trend of developing medical countermeasures for this disease, which had been lurking almost wholly unaddressed in many remote rural areas. There were no technical obstacles to the development of Ebola knowledge before the outbreak in West Africa, but there **was** a lack of a sense of urgency on the part of funders and international health organisations (which contrasts against, for example, the now two-decade-old sense of urgency surrounding pandemic influenza).

It is important to remember that such support and promotion are not only economic and that other tools might be established by institutions to stimulate and facilitate research:

> In parallel, WHO is developing tools to support research and development via data repositories and information-sharing platforms. WHO has also worked with countries, partners and Ebola experts to define a prioritized research agenda. These will benefit not only the efforts in the current Ebola epidemic, but also in future epidemics and will further extend research and development into diseases for which no treatments are available today.
>
> (WHO/D/29, 2015: 15)

The text above is extracted from the WHO strategic response to the Ebola outbreak in West Africa. This is further demonstration of how resources are routed through internationally set priorities. Additionally, the building of such infrastructure conditions not just current research but also that of the future. In the same way the research frame was shifted from bioterrorism to avian influenza, tools directed at Ebola-related research can be recycled for other possible public-health threats.

Secondly, the production of knowledge depends also on its regulation. An example is DURC, research that is subject to heavy institutional regulation, albeit regulation is often developed amidst acrimonious debate. This was the case with the so-called mutant flu, which saw some researchers genetically modifying influenza viruses, rendering them more infectious (although less lethal) in order to understand their mutation dynamics (for a review of the

[47] Critical social research such as that represented by this thesis and some of the literature reviewed in Chapter 2 should be recognised as among the work that has thrived in response to institutional actions.

case, see Cañada, 2013; Lakoff, 2012). Their argument was that we can, by stimulating such mutations, more easily identify them if they happen in nature. However, danger was identified in the potential use of similar mechanisms to genetically modify viruses for application as bioweapons. In this case, government entities regarded certain scientific knowledge as too dangerous and there was an attempt, accordingly, to lock it away. Even though the research report ultimately was published in full, the way the methodology and objectives of the research were presented did set limits. They established norms for future research by defining certain standards for risk and thereby identifying some work as not in line with global health interests. The identification of this type of research as normatively threatening might serve as a deterrent to researchers who want to remain on the orthodox side in pandemic research.

These two ways in which scientific research is entangled in socio-political matters show how certain parts of the knowledge corpus expand or contract. Which knowledge is deemed needed or unneeded, dangerous or useful, valid or invalid is constantly reconfigured through scientific and governmental practices. And in that process, certain researchers are pointed to as rightful knowledge-makers while the status of others, those who do not submit to the normative practices, is put in doubt.

6.2.4 NEW KNOWLEDGE SYSTEMS: ANTHROPOLOGICAL KNOWLEDGE

The task of tackling the threat at its source – considered to be one of the main novelties of new preparedness approaches – has spatial implications. As Hinchliffe et al. (2013) have argued, new modes of governing biological threats have brought governance to new spaces. That means that an outbreak in a remote area can quickly go from being a local epidemic to becoming a PHEIC, as was the case for Ebola and Zika virus.

Indeed, one of the main concerns during the Ebola outbreak stemmed from issues of communication between international health-care workers and local populations. With Western perspectives being dominant in the implementation of global health response, there remains a dearth of knowledge and understanding of how Western modes of governance might best deal with non-Western cultures and communities. Several researchers (H. Brown, 2015; Crane, 2010; Pallister-Wilkins, 2016) have argued that, while the health interventions of the global North in other sections of the globe are often framed in terms of co-operation, that is not always the case, with serious imbalances in power and agenda-setting being evident.

Thanks to its vantage point in these other spaces, anthropology has become a buzzword for accessing the knowledge of local communities. It appears in

the empirical material as a magic bullet to address the problem of colonising health-care spaces in non-Western societies. Even if the claim of anthropology and social sciences being valuable forms of knowledge for public health has been present for a long time (Inhorn, 1995; Janes & Corbett, 2009), the incorporation of these fields' output into governance apparatuses remains challenging. Its existence and value are recognised but not integrated with the mechanisms. This is partly because of the differences in intervention and knowledge-making logics that often stands between social and natural sciences from a disciplinary perspective. Epistemological divergences have come to constitute a difficult obstacle to overcome. For example, this excerpt from a WHO document that discusses preparedness, readiness, and response in social mobilisation responding to public-health emergencies considers how hard it is for public-health approaches to engage with the difficulties of transcribing information on social interaction into standards:

> Anthropological approaches do not come with prescriptive solutions but offer insights concerning beliefs and value systems that underpin human behaviour. How these insights are translated into interventions that guide communications and other public health interventions is subject to interpretation by other professionals, and, as such, solutions are difficult to standardize.
>
> (WHO/D/13, 2009: 10)

Anthropological knowledge gains importance in these spheres only when social mobilisation and engagement with local communities are at issue – i.e., when those communities need to become active agents in the response to a pandemic. In contrast, it remains absent when human populations are consigned to the position of passive elements to be managed through technical interventions (a topic I expand on in Chapter 7). To the knowledge-production difficulties mentioned in the excerpt above we can add the incompatibility of epistemological frames between medical knowledge and social scientific knowledge. The notion that anthropological knowledge can be relevant for public-health interventions is not new even at the institutional level, with the topic being raised at workshops and consulting events related to public-health emergencies in 2009 (WHO/D/13, 2009). Though these ideas had been pointed out on various such occasions, the whole issue apparently had to be considered again from scratch after the recent Ebola outbreak. For example, one of the main lessons learnt from the outbreak as identified at a workshop about Ebola was this, according to the report of the workshop released by the EU: '[R]isk communication: we need to work with anthropologists so we can communicate with the communities' (EU/D/76, 2015: 6).

This role of social sciences has been documented repeatedly in the literature. As Michael (1996: 110) has argued, the social sciences have sometimes appeared in the realm of science not as a part of the science community but, rather, as 'the technical intermediaries who will constitute and enrol the

public as an ally [of science]'. A similar role was ascribed to anthropology during one of my interviews, with an expert in epidemiological investigation from the WHO. According to him, successful enrolment of the public as allies can aid in avoiding unwanted behaviours in local communities:

> Like in [the] Ebola outbreak in West Africa, we need anthropology to understand the behaviour of the population, why they behave so, why they bury their family members in a way that we understand that there is risk, but they do not stop doing that.
>
> (WHO/I/3, 2016: 22)

During our conversation, I noticed that my interviewee – in a parallel with the documents I had analysed previously – was building a sort of knowledge structure whereby biomedicine, public health, microbiology, and epidemiology have a different status than anthropology. Accordingly, not only local understandings and worldviews are othered; so is anthropological knowledge. This takes the discussion beyond the utility of anthropology for public health and focuses on anthropology as ancillary knowledge, something to be added alongside medical knowledge, which is still at the centre of the response.

This is readily visible in literature arguing for the incorporation of anthropology into epidemiological, biomedical, and global health knowledge. Various means of advocacy exist. While some authors defend direct collaboration between disciplines (Inhorn, 1995), others argue for the capability to create new knowledge from an external perspective (Janes & Corbett, 2009)[48].

This example of knowledge delimitation struggles is quite different from the previous three. Here, we depart from a position of exteriority to the global health discourse, from a situation in which there is widespread agreement that the knowledge needed lies elsewhere. Therefore, the task does not consist in establishing certain knowledge as relevant or not, as worth the risk or not, as usable or not. The task has to do with combining the logics and objectives of global health with the logics and objectives of anthropology and other social sciences without the agents of global health having to subject either of the two to compromise. In other words, this is a matter of submitting an external or

[48] The role of anthropology in the domain of global health is especially interesting. It is ironic that the output of anthropology has, in a sense, become othered knowledge in relation to biomedicine while anthropology historically othered non-Western modes of knowing (Lewis, 1973). In fact, global-health actors attempt to enrol anthropology to deal with othered non-biomedical understandings of threat and disease. What those actors seem to be attempting to enrol is precisely that anthropology of the past, an anthropology that has not yet recognised its own role as a coloniser.

othered epistemic community to the normative principles of the global health community.

6.3 KNOWLEDGE DISTRIBUTION

The boundaries of epistemic communities thus are often enacted through the boundaries of knowledge production. Who is allowed to produce knowledge and the status of that knowledge are crucial to determining the expert assemblages that construct the stand-by apparatus. But the knowledge produced has another role: it should be communicated. That communication is another important part of the delimitation of the relevant epistemic communities. The knowledge is not to be communicated to just anybody. Rather, **selective communication of knowledge output is another way in which the boundaries of the epistemic community are established and maintained**.

Knowledge's production and distribution overlap to a certain extent: it is not finished knowledge that is communicated but knowledge in the making. Hence, to whom the knowledge is distributed has a strong influence on how that knowledge is going to be shaped. Awareness of this uncovers a differentiation that will be important in our discussion of the examples in this section: some knowledge distribution is directed at knowledge co-producers (collaborative efforts with other institutions, work among research or policy networks, etc.), and some is meant to be disseminated in a more unilateral manner – for example, to the public. Interactions of partial disclosure too take place. As I explained in the methodology chapter, I was often restricted from accessing certain types of knowledge while having access to others. As I noted in my musings above, this turned me into a partial member of the pandemic epistemic community.

Below, I discuss four, quite different examples in which the distribution of knowledge helps to shape communities. In the first, language appears as a facilitator or barrier/hindrance in the distribution of knowledge, thereby helping to delimit who may access, transmit, and shape it. The second illustrates knowledge being transmitted internally to certain organisations, which may, in turn, have specific knowledge-exchange agreements with other organisations. Such internal and operational flows of information delimit collaborative international communities. Thirdly, I consider the special status of scientists, who not only communicate and receive knowledge but also constantly produce it. At the same time, though, they are often policed to prevent non-members of the community from accessing that knowledge. I discuss DURC issues in this section too, but from a distribution and accessibility perspective. Finally, even though the public are seen as an external element, a calculated stream of knowledge must flow towards them with the objective of building trust and avoiding panic. This kind of knowledge distribution serves as an example of non-reciprocal communication.

6.3.1 KNOWLEDGE, LANGUAGE, AND TRANSLATION

To be communicated, knowledge must be understood. The global aspirations in new approaches to public health face knowledge-distribution challenges affecting inter-region communication. The sheer extent of the use of English as the *de facto* common language (Gordin, 2015) does not mean that everybody can participate in all arenas equally. When attending the BWC meeting with which I began the chapter, I had a chance to be present for discussion of how to get new members, from diverse countries, involved in ongoing development of the convention, especially non-diplomatic or technical staff representing non-Western countries. One of the biggest challenges brought to the table was the issue of language: active membership of the BWC community, especially for people who lack a diplomatic background, demands solid skills in English. This is of particular help for encouraging the perception that one is competent when speaking to diplomats, and it is something that cannot be taken for granted among those from non-English speaking countries. Thinking about this issue immediately led me to connect these dynamics with the political and power inequalities presented in the introduction of the dissertation, wherein Anglo-Saxon countries occupy a dominant position in the international community. Language indeed seemed to function as a gatekeeper of sorts. It is crucial in producing knowledge but also in proving that one is able or qualified to produce it. This is a matter of not just mastering one or another language but also mastering the categorisations and the specific concepts that are part of a particular area of expertise. It is abundantly clear that membership in an expert community depends greatly on the member's (or prospective member's) familiarity with specialist language and fluency in it (Bowker & Star, 2000).

The relevance of English is evident beyond face-to-face interaction. It comes to the fore equally in the establishment of a shared working vocabulary. One illustration is the way in which the laboratory biosafety–biosecurity shift[49] has been imported linguistically. This came up in the interviews both in the Finnish and in the Spanish context as something that had influenced the understanding of required laboratory safety and security measures. Firstly, the biosafety and biosecurity officers at a Spanish university explained to me that the word 'biosafety', which had entered common use long before 'biosecurity', had been translated as 'bioseguridad'. The latter, while phonetically closer to the new term 'biosecurity', is, in linguistic terms, a 'false friend', and it hence created confusion among laboratory workers:

[49] The turn to preparedness and the rise of bioterrorism as a concern have had strong effects on how biological samples are thought about and engaged with in laboratories. In Chapter 7, this shift is analysed in more detail as a change in the way spatial and boundary governance is implemented.

> When we started [...] [the biosafety office at the university], basically, most people [developing biosecurity] came from, let's say, other countries, so when those concepts were introduced here is when you find that, right? You find this dichotomy of 'how do I define "bioseguridad"? Is it encompassing everything? Is it not?' [...]. So [if] 'bioseguridad' is only biosafety, then [for] biosecurity what happens? Do we relate it to the topic of biorisk, or is it also left out?
>
> (SP/I/3, 2013: 96, translated by the author)

The confusion described above necessitated finding a new word to refer to biosecurity. Introduction of that word, which ended up being 'biocustodia', forced a translational bending that, naturally enough, took some time to spread through the research community. At the time of the 2013 interview with university laboratory staff, use of 'biocustodia' apparently had not yet reached their community. Etymologically, 'biocustodia' makes reference to safekeeping; however, as swiftly became apparent to me, still in 2013 in top university laboratories, the differences between biosafety and biosecurity were not clear, on account of translation issues, and also the concept of *biocustodia* was largely absent from the documents analysed.

A similar process took place in the Finnish context. This was revealed during an interview with an expert in biosecurity and biosafety from the National Institute for Health and Welfare (THL, standing for 'Terveyden ja Hyvinvoinnin Laitos' in Finnish). The interviewee explained to me how in Finland, biosecurity and biosafety were originally referred to as 'pehmeä bioturvallisuus' and 'kova bioturvallisuus', respectively. *Pehmeä bioturvallisuus* (referring to biosafety) would roughly correspond to 'soft biosafety', and *kova bioturvallisuus* (for biosecurity) would roughly translate as 'hard biosafety' (see Sissonen, Kinnunen, & Vakkuri, 2012). These translations seemed to be somewhat confusing, so researchers from THL decided to consult the language centre of the University of Helsinki about their proper translation. Staff with the centre suggested that 'biosafety' should be translated as 'bioturvallisuus' and 'biosecurity' as 'bioturvaaminen'. The words 'turvallisuus' and 'turvaaminen', rather than being two distinct words, are inflections of the same root. The suffix '-uus' is generally used to turn adjectives into nouns, while '-minen' usually is employed to turn verbs into nouns (it is roughly equivalent to the '-ing' suffix in the English language). When asked whether these translations generated difficulties, the Finnish interviewee answered thus:

> Well, maybe, a little, because I think the problem in Finland is that people are not aware of biosecurity. I mean they are aware of biosafety, but they don't really know about biosecurity, because we don't have even much biosecurity legislation, and it's not- at the universities or other schools, there's no teaching of biosafety and biosecurity.
>
> (FI/I/1, 2015: 55)

This assists in understanding how knowledge of new practices and threats is conditioned by the ability of each locality to adapt knowledge to its own context. It is doubtful whether the meanings of the terms 'biosecurity' and 'biosafety' in English can be clarified in homogeneity everywhere. Neither is it clear that they even should be. As discussed in the introduction, biosecurity especially is largely understood as a multiplicity (Bingham & Hinchliffe, 2008). One thing that is quite apparent from the example is that adapting knowledge to local conditions is a struggle even among expert communities.

Translation issues have an effect at the expert level but also at lay level, in the case of which there is a double translation process, which involves not only region-specific language but also specialist argot. The following description of arrival in an Ebola-stricken village in Sierra Leone and the difficulties encountered by international public-health personnel attempting to communicate with the locals helps to illustrate this. In this example, taken from an item of scientific news in the journal *Nature*, translation difficulties and issues of explaining diseases across gaps between worldviews influence material interactions with the disease:

> In Yeli Sanda [a small village in Sierra Leone], communication problems began with the very words that local officials first used to talk about Ebola: there is no word for 'virus' in the tongues spoken in the villages along the Kamakwie–Makeni Road. Before the outbreak reached the area, Ebola educators there described the pathogen as a kind of tumbu, or maggot. When Ebola came to Yeli Sanda, a man searched through the blood of someone who had died from it, looking for the maggots. In doing so, he potentially exposed more people to the virus.
>
> (Hayden, 2014: 296)

Here, linguistic factors mediate attempts to explain to the public what Ebola is. This has a direct effect on how people understand the disease and how they are likely to interact with it, thereby affecting its spread. Language acts as a boundary-making device: those who are not able to engage with the knowledge available on the topic might potentiate threat and even become part of the threat themselves as they become infected.

Both the words we use to talk about disease and the way they are translated have many such consequences. Not only are actors without first-hand knowledge of the languages used by expert communities limited in their access and contributions to knowledge; furthermore, their worldviews are influenced by these limitations. The sociohistorical factors that led to English being the common international language for science are directly influenced by recent global political history (Gordin, 2015). This has been read in post-colonialist terms by some authors (Hwang, 2005), who point out the division between

Western and non-Western countries and the gulf between the two sets in their ability to contribute to production of scientific knowledge. Language thus influences shaping of epistemic communities around pandemic threats.

6.3.2 OPERATIONAL AND INTERNAL FLOWS: ORGANISATIONAL BOUNDARIES

Internal flows of information consist of systems of circulating information and co-ordinating responses. They are often rehearsed through table-top exercises, which help to enact the threat in addition to the community that governs it. The way these flows are depicted in the empirical material suggests utility in seeing the individual sectors, member states, or entities that make up an organisation as hybrid actors whose visions and knowledges are not homogeneous. Accordingly, efficient internal flows aid in bringing those visions together and in circulating and homogenising knowledge.

The concept of internal flows has to include a notion of exteriority also, especially since internal communication systems are not fully isolated. In the domain of global health, these systems are expected to communicate eventually with other institutions and even with the whole world. That is one of the roles assigned to National Focal Points (NFPs), which are among the most central tools under the IHR for co-ordinating global health among signatory states. The NFPs are nodes with 24/7 availability that link national health systems with the WHO. However, the articulation of NFPs' designation and establishment in WHO documents presents them as not only nexuses but also aimed at facilitating internal flows:

> Disseminating information to relevant sectors of the administration of the state party concerned, including those responsible for surveillance and reporting, points of entry, public health services, clinics and hospitals and other government departments: NFPs will ensure that all relevant sectors are provided with information received from WHO.
>
> (WHO/D/6, 2005: 3)

This excerpt is from a WHO guide to establishing NFPs at national level. In this guide, NFPs are depicted not only as the connection between a country and the rest of the globe but also as a way to regulate and improve internal communication. Accordingly, NFPs are often depicted as being both the way in and the way out for internationally relevant public-health knowledge. They are hybrid bodies that, by being internal and external at the same time, point out one of the many national borders in terms of distribution of public-health knowledge.

Similar logics are evident in the communication between various trans-national agencies and organisations. There, 'memorandum of understanding' documents can fill a similar role by transforming external communication into internal through establishment of its content and its temporal regularity. In

discussion with an interviewee from the ECDC, he cited ability to communicate between agencies as one relevant issue. Establishing memoranda of understanding was deemed especially useful with regard to information-protective agencies such as Europol. For the ECDC to be able to access external information, they had to prepare such memoranda with Europol, specifying which information should be shared between the two institutions:

> [The] workforce in police background is extremely restrictive, for example, in information-sharing because- and that, especially when it comes maybe to have a just-started or ongoing investigation, that even applies for within police agencies or institutions […]. That's something we did here in ECDC, that to [deal] with Europol we established a memorandum of understanding of what type of information to exchange, and how to exchange, even what Europol would call official information, even to exchange it in a secured way, and also to have a fixed counterpart, which makes life much easier whenever our analyst and epidemic intelligence find something strange and you have a look on this together and, so, we can easily just pick up the phone and call the designated counterparts within Europol.
>
> (EU/I/3, 2015: 31)

NFPs and memoranda of understanding can therefore act both as boundary objects (Star, 2010; Star & Griesemer, 1989) useful to make boundary work (Gieryn, 1983). They make visible the divisions but also the connections between elements of the global health network as they perform their work as functional elements at both the internal and the external level of an organisation, agency, or country. Thereby, the boundaries become recognisable and their permeability is regulated. Two organisations identified as separated organisms become assembled through a stand-by practice that establishes in advance the sharing of knowledge and information.

Mechanisms of this type contribute to the always-in-the-making nature of expert assemblages. In so doing, these flows help to construct the boundaries of the epistemic communities that have access to certain knowledge while also contributing to its production. That said, actual flows amid crisis are not that common and must be rehearsed, as in the case of exercises; enforced, as in that of NFPs; and agreed upon in advance, as with memoranda.

6.3.3 THE SPREAD OF SCIENCE: THE RIGHT TYPE OF KNOWLEDGE AND THE RIGHT TYPE OF KNOWER

When discussing knowledge production, I pointed out that not all scientific knowledge is equally regarded in the realm of microbiological research. Through sociotechnical processes – i.e., processes of governance, regulation,

and institutional and economic support – certain streams of research come to be normative, leaving others to occupy the margins or be described as heretical or riskier. Of course, this has consequences also at the distribution level. Not only that, but the production process, in turn, is governed to some degree via distribution practices. The two are in constant interplay, as can be seen in DURC being subject to limitations in its practice while also encountering potential hindrances to its spread once it has been performed. This brings to the fore the constant struggle between the openness generally considered to characterise good science and concerns about misuse of scientific knowledge. The following excerpt from a piece on gain-of-function (GOF)[50] research discusses the conflicts between these two ways of understanding dual-use science:

> The scientific community has always had a great interest in openly and accurately disseminating knowledge, which is now becoming possible with the advent of open access publications and other web-based tools; the research to increase the yield of the PR8 influenza backbone was in fact published in an open access journal [...]. However, it provides multiple challenges for DURC and GOF research to prevent their dissemination without proper review and management.
>
> (Kilianski & Murch, 2015: 1–2)

In practice, marking certain research as classified because of potential for misuse puts openness of this sort in danger, as do factors such as lack of access to journal subscriptions.

DURC governance is one of the biggest challenges in terms of pandemic preparedness, for there is no clear guidance as to what constitutes dual use or consensus on what bodies should enforce any guidelines created. The case of the 'mutant flu' was handled by the National Science Advisory Board for Biosecurity (NSABB), a US national body whose ability to address the issue arose from both research teams behind the controversy having been funded at least partially by a US body. In the empirical material I analysed, concerns were often raised over how much this issue could be controlled, alongside speculation on who might carry out overseer's tasks. During revision of a guidance document for responsible life-sciences research for global health security, it was suggested that responsibility could extend to journals and further:

[50] Gain-of-function research is, in the context of virus research, aimed at the genetic manipulation of existing viruses in order to change their features. As in the case of the 'mutant flu', researchers who carry out GOF research claim that forcing genetic mutations on existing viruses can aid in understanding how viruses might mutate 'naturally'. Meanwhile, detractors claim that such knowledge is not useful, at least in itself, or that the potential utility of GOF research is not worth the risks entailed with regard to laboratory accidents or the appropriation of genetically modified viruses (or of means of modifying viruses) by potential bioterrorists. This discussion often positions GOF work as among DURC.

> Several journals have adopted policies and review processes to monitor this issue in submitted papers. Some of the issues that have been raised during implementation include: What should a journal do with a rejected paper? What authority can legitimately ask a journal to pause the publication of a paper? Given that researchers may always seek to publish elsewhere, including in non-journal publishing (i.e. scientific web site, conference, etc), journals should not be seen as the only safety net. Efforts should also be developed upstream of submission to journals, at the institute level where the research is carried out and by those funding the research.
>
> (WHO/D/12, 2010: 15)

This excerpt helps to illustrate how the formation of expert assemblages is distributed. In this case, responsibility cannot easily be pinned down as resting with researchers, universities, or overseeing bodies. The expert assemblage that works for the implementation of biosecure practices at the global level is established across institutional borders and boundaries, resignifying the identity and the agency of those bodies. Therefore, the issues raised here in relation to DURC not only are related to ethics – a field that has received considerable attention in literature on the topic (Forge, 2010; Miller, 2009; Miller & Selgelid, 2007; Selgelid, 2009; Somerville & Atlas, 2005) – but also constitute a problem in much more practice-oriented terms. This has to do with redefinition of the academic publishing system and is about the decision-making system that surrounds research and publishing of work that could contribute to raising threat levels (i.e., research that might become part of the threatening assemblage). The questions asked in the excerpt above deal with proposed practices that clash with the way publishers and editors handle submissions rather than point to the core of the ethics dilemmas that dual use brings with it.

Another good example of how expert communities are regulated through the distribution and production of knowledge is the hiring of researchers of specific nationalities. In an article written for *Nature*, Professor of Global Health Trudie Lang, based at Oxford University's Centre for Tropical Medicine and Global Health, described the way the development of good research networks in low- and middle-income countries was hindered by visa issues in the context of the Ebola crisis:

> We knew that hundreds of people in Africa, including nurses, clinicians and pharmacists, had the skills and experience to set up and conduct a robust clinical trial. So in October, we put out a call for clinical-trial staff on the Global Health Network (www.theglobalhealthnetwork.org) — an online forum for medical researchers in low- and middle-income

> countries. Within 24 hours, we had received more than 250 replies from experienced African staff.
>
> Just a few days later, we realized that we would not be able to secure visas for the responders fast enough to ensure them adequate care should they become infected. In the end, we employed staff from the United Kingdom, Australia, France, Ireland and elsewhere — people who could be repatriated quickly if necessary. Although the visa problems did not stall progress, it would have been more appropriate and better for strengthening Africa's research capacity and international ties if we had been able to use the skilled workers from African countries.
>
> (Lang, 2015: 30)

This case illustrates access to development of research expertise being barred for those who, if becoming infected – and therefore threatening – would not have been able to receive proper health care themselves because of their nationality. Priority being given to hiring of Western staff is a predictable result. Furthermore, as the excerpt suggests, the roadblock connected with the nationality of African staff hinders the development of a community of African professionals able to deal with diseases that are typical of the areas where they live. In consequence, areas where the health-care infrastructure is not highly developed and that therefore are identified as especially threatening become unable to develop local expertise, and they must keep depending on global expertise and agendas powered principally from Western countries.

Considering scientific knowledge in terms of production points toward questions of whether knowledge is needed or unneeded, dangerous or useful, valid or invalid. When the focus shifts to distribution practices, the question becomes one of access to knowledge and development of local expertise. Such access is obstructed through laboratory biosecurity measures, limits to the spread of knowledge, and impediments created by legal frames for migration.

6.3.4 COMMUNICATION WITH THE PUBLIC: ENGAGING THE VULNERABLE

Regulating the publication of scientific research keeps knowledge away from not only the scientific community but also the public. The relationship with the public is where the boundary between the expert and the vulnerable assemblage is drawn. In a sense, public communication is understood as a necessary evil: for avoiding controversy, the public must be incorporated into the information flow, but this has to be done without provoking collective fear. That task seems very tricky to accomplish (see Massumi, 2005). One way of handling it is for the public to become a partial member of the community. In this, the way public communication works shows evidence of the turn to preparedness. As some scholars have noted, one characteristic of the

preparedness shift has to do with growing interest in communicating with the public through visually oriented, accessible communication tools (Torrejón, Tirado, Baleriola, & Maureira, 2016). In the material, I found two ways of referring to public communication, with the choice between them depending on whether the public are directly affected by a pandemic event or not.

On one hand, communication with unaffected populations is directed at avoiding misunderstandings related to risk. One informant cited Ebola as marking a turning point in public communication in Spain:

> Ebola has taught [...] a lot to all of us. From that you learn. You realise that sometimes even with risks that technically do not mean any serious problem for public health, the administration of the communication needs to be done well and with a lot of care.
>
> (SP/I/1, 2015: 45, translated by the author)

The informant is referring to the handling of the case of a Spanish nurse who contracted Ebola from a priest evacuated from West Africa during the 2014 outbreak. The case received considerable attention from newspapers and television. The attribution of responsibility and the decision to kill the nurse's dog Excalibur as a preventive measure became hotly debated in public forums. These decisions were taken by the government with the aid of expert committees. The public-information strategy gave way to constant speculation and led to public protests against the killing of the pet dog as a preventive measure. The handling of the communication situation helped to construct an emergency very different from the one technical staff had in mind – which was understood, as my interviewee pointed out, as not especially difficult.

Engaging with affected populations, on the other hand, brings with it a different set of problems. In a commentary piece published in *Nature*, Joanne Liu, International President of Médecins Sans Frontières, identified failure in communicating with affected communities as one of the main hindrances to efforts to bring an end to the Ebola outbreak:

> In the Ebola epidemic, strangers showed up in villages in what looked like space suits and took away loved ones, with only around half being seen again. At the peak of the epidemic, people were often not told when their relatives had died or were not given the chance to bury their dead according to custom.
>
> (Liu, 2015: 28)

This excerpt offers an example of the impression that a specific response may give when there is a lack of shared understanding or communication with the affected communities. In Liu's view, engaging with communities to help them understand Ebola was one of the main measures that could help to end Ebola.

Yet these important views are consistently absent from policy, guidelines, and implementation documents. As the following extract shows, however essential public communication has been considered in the domain of public health for decades now, this element seems to be lacking in public-health response. The extract represents the views of the London School of Hygiene and Tropical Medicine's Professor of Infectious Disease Epidemiology David L. Heymann, as expressed in an interview published by *Nature*. In the interview, he stressed how the experiences of international intervention are not integrated into current international policy:

> Yet the lessons that I have learned in rural Africa since participating in the investigation of the world's first recorded outbreak of Ebola in 1976 still apply [...]. Communities need the knowledge and the means to prevent transmission, including safe ways to transport infected people to isolation wards and to handle dead bodies respectfully.
>
> (Heymann, 2014: 299)

This lack of communication remains one of the main obstacles to understanding biological threats in compatible ways between expert and non-expert communities.

An issue of perspective comes in here. While, as Liu and Heymann pointed out, the general population seem to lack information, high-ranking officials often have a parallel feeling: that public-health professionals do not have some of the information necessary for doing their work properly. In an interview, Chan turned the problem around. For her, the issue is lack of information flowing from the communities to the institutions:

> With the benefit of hindsight, the mistrust is a major problem [...]. [I]nstead of sending patients to a treatment center as early as possible, people in the community kept their loved ones at home and nursed them. It was like a peat fire spreading underground [...]. Information was not flowing up. That is a big problem. You cannot manage what you don't see and what you don't know.
>
> (Kupferschmidt, 2015: 495)

Her comments illustrate the ways in which flows of knowledge and information are not unidirectional. This notwithstanding, the focus in the empirical material was put on public communication rather than public engagement[51].

[51] The opposite approach, reframing public communication as public engagement, has been one of the main moves in relation to another controversial matter: biobanking. Faced with concerns raised about misuse of samples, practitioners and researchers alike have been forced to reconceptualise patients and donors as stakeholders, and there have been many efforts (only some of them legal) to engage them as another interested party in biobanking ventures (Cañada, Tupasela, & Snell, 2015; Petersen, 2007).

6.4 AN IMAGINED OTHER

Epistemic communities emerge, I have argued, through diverse knowledge-making practices. Many of these communities are shaped through the existence of strong institutions and organisations that govern knowledge. However, the boundaries of the epistemic communities do not correlate directly with the boundaries of the organisations. Rather, they are fruit of assemblages and networks of knowledge, collaboration, international co-ordination, and work with stakeholders. In other words, knowledge production and distribution are arranged around notions of interiority and exteriority but without a clear boundary. On the contrary, those boundaries are challenged and reaffirmed continuously.

Indeed, **to a certain extent, the existence of the pandemic epistemic community can be understood as in opposition to other communities, a result of difference**. For example, Barad (2007) has described those differences and boundaries as formed through intra-action processes; i.e., the idea is that only when the apparatus is enacted do the interior and the exterior of the apparatus emerge. In other words, the epistemic communities that produce preparedness knowledge come to be through internal and external processes of knowledge's making and distribution equally. Looking at the empirical material, I could appreciate two communities, each heterogeneous yet differentiated from the other, that worked as exteriorities for the pandemic epistemic community. This is not a new idea, with Kjetil Rommetveit and Brian Wynne (2017) having argued that the notion of the scientific community as built in opposition to a non-scientific one dates back to Francis Bacon's work in the 16th century. **In my empirical corpus, the communities exterior to the expert are roughly divided in two: a threatening community and a vulnerable community.**

The threatening community consists of social actors that may contribute to a pandemic outbreak. The most obvious example of threatening social actors is bioterrorists. While it may seem obvious that terrorists do not in any way form homogeneous interconnected networks, they are very frequently referred to as a specific social group with agency. The associated idea of a bioterrorist community is hard to grasp, especially when one takes into account that, as Lisa Stampnitzky (2013) has argued, terrorism is manifested as a reconceptualisation of various forms of political violence and not as a unitary movement. Therefore, what we witness is a sociotechnical and expert resignification rather than a specific shift in the way political violence is enacted. Along similar lines, Khalig Tölölyan (1989), has argued that the terrorist self is often constructed through wider narratives that politicise the figure of the terrorist, turning it into a simplified political fact that follows cause–effect logics; that is, the terrorist carries out a violent political response to a political *status quo* that is set off in ideological opposition. Such

simplification leaves aside the complex socio-political contexts in which historical, social, and knowledge-making-related processes render a terrorist identity discursively possible – i.e., it neglects to consider that the identity of the terrorist is made possible through the categories offered by political discourses and structures.

With these musings, I do not argue that a 'bioterror community' does or does not exist. My focus is instead on how one is formulated as opposed to the expert preparedness community. My material expresses the idea that the knowledge made by law-abiding scientists and organisations should be kept out of the hands of this group but also that this group should be kept from engaging with hazardous nonhuman actors such as viruses. The threat posed by the bioterrorist community is accentuated via emphasis on its invisibility: they could be anywhere and could occupy any space. Indeed, the spaces in which the potential bioterrorists lurk stay completely undefined. Accordingly, in many interviews, when the time arrived to talk about preparedness for an eventual bioterrorist attack, the response given, in generalised form, was 'I cannot say more; we are working on it'. That said, less obvious examples reveal more complex relationships between threat and protection. The empirical material contained descriptions of local populations that represented a threat by hiding or not sharing information (Hayden, 2014) or by engaging in negligence in their biosecurity and biosafety practices. Indeed, any engagement with the virus beyond the terms of the international guidelines and regulations has potential to represent an increased threat.

The vulnerable community, on the other hand, is pronounced to be an exteriority not because it represents a threat but because it is ostensibly a collectivity unable to handle its own protection and dependent on expert assemblages formed by institutions and scientific experts. This image is reflected in the care put into public communication. This type of communication, I have argued, is focused on avoiding public outrage or the obstacles posed by community resistance. It seems as if communicating with the public is just a way to avoid greater evils such as public controversy, which would affect the public-health response. Talking about the relationship between preparedness and the public, one of the Finnish interviewees described the relationship in the following way:

> Well, things are happening undercover. We are not talking about them openly. We are prepared for many things which we do not publicly announce, we don't make a big fuss about, […] it's not publicly discussed. So it might seem that we are doing nothing but- or we are doing very little, but I can say that we are doing much more than people know, and I think it has to be that way, […] normal people on the street they can't do much about them; it's our responsibility to take care that people are safe here. So it comes with the job kind of, and then, on the other hand, some of the measures are such that it's- for them to be effective, it's better that the information is not spread.
>
> (FI/I/2, 2015: 164)

The public are described as not prepared for or not capable of handling certain information. As Michael (1996) has stated, publics tend to appear as composed of relatively ignorant and disenfranchised citizens who should be educated and enrolled in the scientific project. The pandemic discourse, however, is very selective in its description of the need for scientific literacy among the public. As the excerpt above shows, often it is partial ignorance that is preferred to complete ignorance – affected populations should have access to only the necessary technical knowledge: good practices as established by pandemic guidelines. They should be protected, but the extent to which they should be included in public response is to be decided not by them but by expert communities.

Echoing these concerns, Martin Bauer and George Gaskell (2008) have argued for an understanding of social representations of science and biotechnology that goes beyond simplistic understandings of vulgarisation and diffusion among the public. For them, referring to the way scientific knowledge is translated across communities (or 'milieus' in their vocabulary of social representations theory) in terms of socially constructed representations helps to counter those simplified perspectives. In this connection, however, we are talking about understandings at the expert level that are questionable not because of their lower-level vulgarisation or diffusion but because of the identification and categorisation processes that they construct, implement, and make productive. Such processes of 'experts' often employ linear communication models – such as those of vulgarisation and knowledge diffusion – that, although much criticised, have not disappeared, as some of the examples I have used illustrate.

Threatening and vulnerable communities enact the human element of the threatening and the vulnerable assemblages. Furthermore, the way they are mapped through technoscientific and political technologies is central to the imaginative enactments (Lakoff & Collier, 2010) that make preparedness possible (see Chapter 2). **Each of these communities is homogenised in a manner similar to the imagined national communities described by Benedict Anderson.** National communities are imagined because 'regardless of the actual inequality and exploitation that may prevail in each, the nation is always conceived as a deep horizontal comradeship' (Anderson, 1983: 7). Indeed, regions remain homogenised by means of discourses (Billig, 1995) and sociotechnical practices (Tamminen, 2010). As Benedict Anderson argued, this homogenisation process is instrumental to the maintenance of the nation as a viable entity. When I felt so out of place at the BWC meeting, I saw everybody else as an expert in the community, skilfully moving and interacting at the Palais des Nations. They all seemed to belong. But there were hundreds of people there, and how could I know their level of expertise and the feeling of belonging that they experienced? The way the BWC community seemed homogenous and the way I saw myself as an outsider to it echoes the logics

under which threatening and vulnerable communities or assemblages are shaped. **Homogenising the threatening and the vulnerable communities serves the purposes of making concrete the object of governance for the actions of the preparedness apparatus and of settling the legitimacy of the apparatus's existence.** In other words, the same way imagined national communities are instrumental to the maintenance of national projects, so is the imagining of threatening, vulnerable and expert communities for the upkeep of the global health project.

'Global health' emerges partly in the face of the need to come to terms with the growing interconnectedness of health in the world, but in that emergence, in laying down the structure and the systems necessary for this end, it also enacts a series of elements that help to build the imagined community: a common language and common vocabulary, shared administration, common documents and guidelines, acknowledged leaders, and (most importantly) shared experiences – elements very similar to those described by Benedict Anderson (1983). **I do not wish to suggest that the preparedness epistemic community is a nation; rather, I argue that its functioning demands that it be imagined in similar terms. In front of globalized interconnected health policies, similar senses of belonging are put forward. Through elements such as those I just mentioned, a threat and a series of solutions become shared across differentiated regions.** Just as a nation needs to be imagined in order to gain traction among its members, epistemic communities must have an imagined common ground and objective. An expert community – more capable than others and differentiated from the object of protection and from the threatening object – is imagined as capable of knowledge-making and governance. The foregoing is not meant as an evaluation of whether the community is actually effective in its governance and knowledge-making. The suggestion is simply that, if the biopreparedness apparatus itself is to function, the governance and knowledge-making require collective identification of the more-than-human collectives that they are aimed at governing and knowing.

In my final words on the topic, I offer a reminder that these imagined communities – and the diverse boundary-making practices that shape them and destabilise them – are not context-independent and objectively defined social processes. The changes and possibilities as they are depicted in the empirical material are specific worldviews that enact power relationships. These are biosocial processes that, as Novas (2008: 139) has stated, assert 'who has the power to create particular futures, how those futures are made, and who is excluded from these visions of the future'. The futures harboured in the empirical material for the diverse assemblages imagined are both inclusive and exclusive. They depict the role of life forms as multiplicities, as able to be both victims and vectors, allies and threats, vulnerable and threatening, local and global. This constant ambivalence is what makes pandemic-related implementation work so challenging: the boundary between

threat and protection is, as I expand upon in the following chapter, constantly on the move.

7 THREATENING LIFE AND MOVABLE BOUNDARIES

> *I have conducted many interviews already. Today was the last one. Once more, I had to identify myself at the entrance of the building, prove that I am who I say. Similar routines have taken place when I meet with experts in official buildings. At the door, I need to fulfil a routine that proves I am trustworthy, that I should be allowed to enter the building. The routine varies: metal detectors, passports, IDs, background checks, personal documents being left at the security booth. Then I gain a visitor badge that allows me to wander around the building. My interviewees are always friendly, but a weird feeling remains every time. A feeling that, before being able to access pandemic expertise, I need to prove myself. I need to show what my intentions are, that I am not there to criticise too strongly, that I am not there to steal confidential information. I need to convince them I am part of 'the good guys'.*
>
> *Recollections for a Research Diary, July 2016*

As a knowledge-producer myself, I too become part of various epistemic communities as I learn new information, reformulate it, and distribute it. The type of knowledge I produce, the knowledge I gain access to, my collaborative work, and whom I communicate my ideas with (through articles, presentations, and lectures) contribute to that process. All of those activities help me position myself in relation to the rest of the pandemic community. More specifically, this work helps me position myself as an insider-outsider, somebody who is allowed to enter certain spaces but always under the conditions ordained by the expert community. I can attend some meetings but not all of them. I can interview experts but not discuss certain topics. I can read documents but not the classified ones. In other words, my interaction with certain people or information could still be considered a source of potential threat. As an insider-outsider, I am both a researcher and a threat, precisely because of the potential for me to engage with other actors in threatening ways. Ultimately, I could become expert, threat, and/or vulnerable on the basis of how I interact with other actors, how I identify myself, and how I present myself to the expert community.

This ambivalence is not limited to affecting me and knowledge-makers. Almost every actor considered in pandemic preparedness and response can be depicted as a collaborator, a victim, or a vector – as helping to stop the spread, as susceptible to it, or as helping to further it. In sum, **establishing whether an actor is expert, vulnerable, or threatening in accordance with**

that actor's associations and engagements is the main challenge for pandemic preparedness and response.

One clear example can be seen in how certain forms of life are positioned as **both** victim and vector. However evident, such ambivalence or porousness of the victim/vector[52] duality has been discussed very seldom in the field of public health. Margaret P. Battin, Leslie P. Francis, Jay A. Jacobson, and Charles B. Smith (2007) have argued that humans' status as vectors was not a concern in work on medical ethics for quite some time. It was the appearance of HIV/AIDS in the 1980s that stimulated attention to ambivalence in that field. Accordingly, while clinical medicine tends to see patients as victims, public health now views them as enacting both roles at the same time. In such framing, viruses engage with their hosts in order to survive and spread. Thus, molecular lives are threatening not merely by themselves but also in their engagements with other life forms. Once a threatening form of life infects a human or another animal, the infected form starts to enact a different social role. Humans and other animals become both victims and vectors. They need attention from a medical perspective but also attention to their role in spreading the disease.

This sort of hybridity has been addressed in some STS literature. For example, Haraway's OncoMouse™ creature (Haraway, 1997), another type of biological hybrid, has been described by some authors as either a victim or a hero (Myerson, 2000, as cited by N. Brown & Michael, 2004). Haraway's transgenic mice, genetically designed to be the perfect subject for biomedical research, come to stand in for humans in a model for cancer research that might eventually save the lives of humans while, at the same time, enacting the hope and suffering of human cancer patients.

A similar multiple role is played by the genetically modified mosquito intended to fight vector-borne diseases (see Beisel & Boëte, 2013; Reis-Castro, 2012). These mosquitoes are modified genetically and then released into the environment to affect existing mosquito populations in areas stricken with vector-borne diseases. These mosquitoes can have either of two effects on the

[52] Use of the category 'vector-borne diseases' usually involves a more restrictive definition of a vector, generally reducing the spectrum of vectors considered to insects alone. This is visible in the WHO's list of vector-borne diseases (see http://www.who.int/campaigns/world-health-day/2014/vector-borne-diseases/en/). In contrast, the *Dictionary of Epidemiology* (Porta, 2008: 289) includes as a vector 'an insect or any living carrier', applying a broader definition. Among others, J.Y. Takekawa and colleagues (2010) took this distinction to heart, when speaking about viruses spread by migratory birds, in work discussed, in turn, by Lyle Fearnley (2015). My intention is not to redefine the category, take a side of the debate, or suggest a new way of using it. Rather, I employ the reflection made by Battin et al. (2007) as a rhetorical device for discussing the multiple roles acted out by diseased humans and animals in the context of pandemic emergencies.

population: its eradication or its replacement, depending on the genetic modification performed. Each of these can be read as a differentiated bio-objectification process (Reis-Castro, 2012). The mosquito, formerly a threat, is turned into a public-health tool and, hence, into a hope that also represents a risk of hard-to-predict environmental consequences.

Another popular example of multi-role life is the sheep of John Law and Mol (2008), which was, in their vocabulary, enacted in a multiplicity of roles when engaging with an epidemic of foot-and-mouth disease in 2001. Enmeshed in a multiplicity of relations, a sheep could take on a veterinary, epidemiological, economic, and farming role while also being an acting sheep. These various sheep emerge when one looks at the practices in which the sheep figures – in each practice, a different sheep is being acted. The sheep is not an actor in itself; it becomes active and agentic when entangled in social relations, in which the sheep both acts and is acted upon (i.e., enacted). With their depiction, Law and Mol challenge the division between agentic and passive. Is the sheep doing things, or is it being pushed around?

The characters depicted in the examples above are turned into many things when set in human–animal relationships: hopes, risks, threats, tools, products, objects, patients, and assets. Ultimately, they become companions (Haraway, 2003), with which we share spaces, life, a destiny, and also disease. Challenges and questions similar to those posed in connection with the OncoMouse™ case, the genetically modified mosquito, and the actor-enacted Cumbrian sheep are faced in pandemic contexts, with the difference that the multiplicity depends, more than on how the threat is enacted, on the multiplicity of the viruses that come to stand for the threat in consequence of the all-hazards approach. **Biological threats are not reduced to the pathogens that take the leading role, any more than vulnerable life can be reduced to human populations**. **These must be understood as hybrid engagements between different social actors.**

With this chapter, I examine how human, animal, and molecular life and the engagements of these forms are depicted, alongside what sorts of governance techniques are proposed to engage them and neutralise the threats they may enact. Firstly, I look at what more-than-human and hybrid governance might look like in the context of pandemic preparedness and emergencies. This entails presenting an argument that preparedness represents new maps, a Foucauldian diagram of life and power in which the manner of understanding security and populations leads to new ways of governing them. I posit a new way of governing that is composed of two elements: a focus on movable boundaries and a more-than-human approach to governance. Secondly, I present a description of how humans, animals, and viruses are understood in the empirical material, moving on from this to consider how, irrespective of their characterisation as separate actors, they actually tend to form hybrid social actors that threaten society. Next, I discuss four ways in which such hybrids are governed in relation to boundaries. Hinchliffe et al. (2013) have argued that spatial governance is one of the main

characteristics of today's governance of biological threats. Building on their work, I present examples of governance 1) in laboratories, 2) in transport and travel, 3) in health care, and 4) in everyday life spaces. Finally, I offer the conclusion that the main consequence of this new diagram of life and power is that, if molecular biological threats are to be governed, animal and human forms of life too need to be governed. That is, for pandemic response to be effective, biological threats have to be understood as biological hybrids. This foregrounds a resignification of what a human, an animal, and a virus is during a pandemic emergency.

7.1 GOVERNANCE AND HYBRIDITY

One of the main pillars of my argument is that a more-than-human understanding of identification and categorisation processes in pandemic preparedness and emergencies is essential. Therefore, in conceptualising the assemblages discussed in the previous chapters – i.e., the threatening, vulnerable, and expert – I have taken into account this more-than-human perspective when necessary. This has perhaps been more visible with regard to how stand-by mechanisms are organised, with technologies and objects usually enrolled during preparations for a pandemic emergency. Humans have taken over in the formation of epistemic communities. Although the making and distribution of knowledge often relies also on nonhuman actors, I found that epistemic communities and access to knowledge are more readily conceived of in terms of human agency and groups.

With regard to governing threatening forms of life, the more-than-human perspective I have been arguing for enters in full force. To discuss this, I will formulate governance in a manner that is useful for speaking of biological threats. This involves outlining a Foucauldian perspective that I then complement with hybrid and more-than-human understanding of social actors. This section of the chapter is divided into two parts. In the first part, I review how governance during biological emergencies and epidemics has been conceptualised, with the aid of Foucauldian analysis of securitised public-health response (Foucault, 2008). I conclude that current logics of governance point to a new way to organise bodies and boundaries between the healthy and the diseased. With the second part, I argue that the new diagram should be understood in terms of hybrid governance. I formalise my view of what a more-than-human approach to governance might look like by relying on ANT understandings of sociotechnical hybridisation.

7.1.1 DIAGRAMS OF LIFE AND POWER

Foucauldian diagrams are related to power and governance similarly to how epistemes (see Chapter 6) are related to knowledge production. In other words, they define the rules, logics, and conditions for the governance of life forms through the exercise of power. What is particularly interesting about these diagrams is that a specific understanding of life and populations is what establishes the foundation on which public-health action can be carried out.

Diagrams represent ways in which power is exercised, rather than possessed. The exercise takes place through dispositions, manoeuvres, tactics, techniques, and functioning. Foucault (1975) uses the word 'diagram' to describe the map – or, more accurately, sets of superimposed maps – enabling, describing, and guiding the flows of the power dynamics within the context (in his case, the prison). Deleuze (1988) elaborated on the concept by describing them not as explicit ways of governing but as speaking through expression and action (instead of speaking and laying out rules). It is when power is exercised through diagrams that they become visible. They are not attempts to represent specific views of the world; rather, they aid in creating new realities and new models of truth. That is, the diagram is preceded by the actions that bring it to life.

As for strivings to understand how diagrams of life and power work in the context of epidemic outbreaks, the response to epidemic processes was analysed early on, by Foucault (2008) himself, from a biopolitical perspective. He illustrated three historical diagrams of life and power, each associated with a distinct epidemiological moment:

1. The first diagram emerged in the governance of leprosy during the Middle Ages. At that time, people infected with the disease were isolated from the rest of the population. They were sent to a colony. In consequence of this approach, the population is divided, and territorial boundaries are established between healthy and diseased populations. This diagram of life and power is applied through law, punishment, and interdiction.
2. The second diagram was expressed through the fight against the plague in two separate outbreaks, in the 14th and 17th centuries. During both outbreaks, governance relied on observation, surveillance, and correction. People were not excluded and split up but included and organised. In addition, populations and goods were subjected to quarantine. In this case, while there is a boundary separating the healthy from the diseased, said boundary is drawn within the population that is being governed.
3. The third example comes from the smallpox epidemic in the 18th century. In such cases, governance acts through means of calculation and intervention. The rules and logics of this third diagram are explained well by Eugene Thacker (2009: 141): '[T]he smallpox response is transformed by the development of inoculation and

> vaccination, and their subsequent transformation into public health and hygiene programs.' This case is interesting because it starts to incorporate biomedical techniques such as inoculation and vaccination into the spatial governance of the population.

Analysing diagrams in historical terms does not mean that they can be neatly linked to clear-cut periods. It is important to note that, as Deleuze (1988: 35, 44) has pointed out, diagrams are 'intersocial and constantly evolving'. Hence, every diagram includes 'certain relatively free or unbound points of creativity, change and resistance' and thereby offers possibilities for change. One does not replace the one that came before it; in contrast, their relationship involves transforming and reflecting each other. What Foucault did by explaining diagrams during leprosy, plague, and smallpox – and what I do in this chapter by referring to a preparedness diagram – is give a snapshot of a very specific point in history. Accordingly, diagrams connect with each other before we researchers decide that they have acquired a new identity.

Current approaches to public health suggest a fourth diagram, wherein the rules for governing life are again redefined[53]. **I conceptualise and illustrate this diagram as having two key characteristics: a more-than-human characterisation and spatial mobility.** Firstly, even though 'bio-' as used by institutions refers mostly to molecular forms of life (namely, viruses), I argue that from a biopolitical perspective, 'bio-' goes well beyond the molecular at the level of intervention and addresses simultaneously human, animal, and molecular dimensions of life. Under these logics, as in the Foucauldian diagrams, the spaces of action are again redefined but in more-than-human terms. Secondly, with regard to the spatial element, advances in biotechnology and globalisation have moved the focus from localised measures to laboratories, hospitals, and airports – all of which as parts of global networks become globalised spaces of disease. These changes in the object and space of intervention are elemental to the novel way of dealing with biological threats.

I believe that this argument fits nicely with the formulation by Collier and Lakoff (2015) of 'vital systems security'. In their diagram formulation, they presented a connection of state and national vital infrastructures with the protection of populations. My contribution to their diagram is to suggest that

[53] The fourth diagram is similar in status to those articulated by Foucault. It refers to contextual assemblages that emerge in Western political spaces (though with a claim to globality), even if they then have an effect on post-colonial and non-Western localities and even, in a way, bring them into being. Foucault did not claim to formulate a theory of life and power (Dillon & Lobo-Guerrero, 2008), and neither do I. My intention, as I have already argued, is to expose how globality is made in localised spaces, not to establish theories with global reach.

the entanglement between the state and vital infrastructures is, in the context of pandemic preparedness and response, tied to specific understandings of threat and life. These understandings go beyond the human, adding a new component to that diagram of power: threatening lives are understood as hybrid formations that combine molecular, human, and animal. Furthermore, those hybrid life forms constantly produce assemblages that render life variously more or less threatening not only to populations but, as Collier and Lakoff argued, to the infrastructures on which the state depends.

7.1.2 HYBRID GOVERNANCE

In the project of protecting populations and infrastructures, governing has been transformed into a technical matter, as I argued in the previous two chapters. To prepare, enact, and implement the complex systems that are necessary for dealing with multiply defined pandemic threats, health organisations and governments need to rely on technified approaches to governance. The technical, Latour (1999) has argued, is neither a human nor a technological matter but a complex process that involves both the human and the nonhuman, with agency, goals, and potentialities being shared among the various actors involved. The distribution of these elements across/among individual actors, technical objects, and the collectivities they form becomes visible in the use that the project of pandemic preparedness makes of technology, with vaccines, antivirals, PPE, and surveillance automation being a few examples. Here, the nature/society and human/nonhuman boundaries are called into question as they continually get crossed in efforts to fight – using Haraway's (2003) terminology – naturecultural threats.

In the same way the technical means to fight pandemics are hybrid, so are the pandemic threats that are being governed. A hybrid vision of governance proceeds from Whatmore's (2002) premise that nonhuman forms of life frequently get entwined with multiple networks of human social life. In fact, while biological agents hold a leading role, full-fledged pandemics are impossible without microbiological life becoming entangled with humans and animals, alongside other non-living social actors. In other words, without being enmeshed in more-than-human hybrids, viruses cannot thrive, cannot enact the pandemic threats that the preparedness community again and again virtualises. Viruses make it all the way to becoming pandemics because they are enabled by the humans and animals they infect but also by the transportation technologies that help them travel long distance in a short time and the farming industries that often serve as a breeding ground for contagion involving animals. In light of these patterns, the knowledge-making machinery and the stand-by mechanisms – despite focusing on the virus – are aimed at governing something much bigger: a threatening assemblage.

As Whatmore (2002: 3) has characterised it, the concept of hybridity helps us 'negotiate the temptations of the "one plus one" logic or "mixture of two pure forms"'. The identity of those individual actors that form an assemblage

is often taken for granted; however, that identity is up for discussion during knowledge-making processes. Every virus's genetic make-up deserves to be open to consideration now, as does its relationship with its host. In older diagrams of governance, such levels of analysis were not available, and the human-virus hybrid was understood as a single entity and governed as such. Today, the molecularisation of biopolitics (Rose, 2007) has made more fine-grained governance processes possible. Yet some other black boxes are not analysed at the same level. Importantly, the host's beliefs and day-to-day practices are ignored until they become clearly problematic. When somebody in Yeli Sanda starts sifting through the blood of a dead person to hunt for maggots, it becomes more visible that the assemblage is composed not just of the virus and the human, also including the language, worldview, and beliefs of those who are part of the community of the deceased. Language, worldview and beliefs that end up having a very material way of becoming visible.

These hybrid properties of threatening associations – purpose and intentionality – do not belong to the object or subject. Rather, they are part of the institutions; apparatuses; or, in Foucauldian terms, *dispositifs* (Latour, 1999). As I illustrate, it is the context, the diagram, the actions, and the several multiplicities in which actors are enacted that give meaning and purpose to animals, humans, and viruses. Only as part of collectivities do both objects and subjects come to exist. It is the preparedness apparatus, the stand-by strategies and practices, and the production and distribution of knowledge that act upon those various actors while they, in turn, are acting and carrying out their practices. It is through those processes that they are enacted as a multiplicity, as hybrid living beings.

7.2 HYBRID THREATS

So, more concretely, what are these hybrid life forms? How are they conceptualised, and how do they act such that they should be understood as hybrid assemblages? How do animals, the human, and viruses come to be understood as part of the same categories and identities? Threatening forms of life have their agency, abilities, characteristics, and everyday life practices. Very much as are material resources – vaccines, antivirals, PPE, etc. – they are to be handled and distributed in line with best practices or, most precisely, in accordance with the engagements they can have with other social actors; i.e., they are governed on the basis of the hybrid formations they can take part in. That said, we can conceive of a hybrid only if having thought in terms of the individual elements first (Lorimer, 2015). Animals, humans, and viruses can be considered to take hybrid form only if categorised as separate initially. This is a game wherein boundary work establishes certain identities – animal, human, and viral; threatening, vulnerable, and expert; etc. All these identities

can later 'crash through' the boundaries that are often taken for granted in governance engagements.

In this section of the chapter, I explain how relevant life forms move from being understood as separated entities to, as governance proceeds, later getting governed as hybrids. When viruses engage with humans and animals, they instil in the hybrid formation its own characteristics. In other words, the host too becomes threatening, since it can spread the disease. It has become both victim and vector. The human or the animal thus passes from being only something vulnerable – i.e., something to protect – to something we need protection from: a biological threat. In that process, a specific notion of otherness is constantly present.

The discussion below is divided into four parts. In parts 1 and 2, I discuss how humans and animals, respectively, are presented in the empirical material. In the third part, I examine how molecular life is presented as the ultimate source of threat although it can also be enrolled for the cause of the preparedness apparatus. I conclude the section by pointing out the hybrid possibilities that those three 'pure' actors offer, both despite and because of their multiplicity.

7.2.1 HUMAN LIFE: BEHAVIOUR, DENSITY, AND POPULATIONS

Under the Foucauldian conceptualisations of governance and power I have discussed, human populations are among the most prominent actors in epidemic processes, and they are at the centre of the emergence of biopolitics. From that perspective, according to Michael Dillon and Luis Lobo-Guerrero (2008), a population is not so much a subject, a people, or a public as a cohort of biological individuals. This is visible in basic definitions of public health. Indeed, one classic definition of public health that is widely used and adapted states that public health is 'the science and art of preventing disease, prolonging life and promoting human health through organized efforts and informed choices of society, organizations, public and private, communities and individuals' (Winslow, 1920: 30). From this angle, public-health work at the global level is concerned with the health of global collectivities, with those elements being regarded as technical elements to know and govern.

The role of populations as something to protect is not always that clear in the empirical material analysed. There, human populations often feature rather more as an element that is not so much being protected from the threat as playing a role in its spread. Elements such as human behaviour, population density, movement, infection-awareness, and small-scale farming practices drive epidemics. One WHO report on public-health emergencies states that 'what people do or do not do can either increase or decrease the risk of epidemic generation or propagation' (WHO/D/13, 2010: 6). Here, human populations become one more technical element that pandemic preparedness and response need to take into consideration. In this connection, technical knowledge takes a dominant position that removes subjects from the

documents. Human populations and citizens are rendered as technopolitical elements with a de-subjectified role in implementation of global health policies. Below, I use some excerpts from my corpus to discuss two distinct roles of human populations presented in the empirical material: 1) interfering with public-health response and 2) posing a communication problem that can be approached through knowledge-making practices.

In the first role, human populations are actors that are able to influence the spread of the pandemic. Human populations are portrayed as influencing the course of pandemic events through their behaviour, density, and movement (WHO/D/13, 2010). Hence, they appear as, in effect, a mediator of the disease. Alongside behaviour, density, and movement, their lack of knowledge is presented as among the main causes for said influence, with lack of knowledge leading to lack of proper life-governance measures in some areas. Certain living conditions can make the interaction between humans and viruses more problematic. For example, small farming operations in non-Western regions are generally regarded as less controlled. Accordingly, in evaluation of the level of risk posed by the H5N1 influenza virus for human health, the Spanish protocol for pandemic preparedness and response turned its attention to non-Western areas where practices were seen as less secure and more threatening. These practices and the assemblages formed by humans, animals, and viruses exacerbate the threat of the pandemic:

> Also, the emergence of extended outbreaks of H5N1 in several countries on the African continent during the last year has been reason for alert. In these countries, animal-surveillance systems are not fully developed, and their production systems, as happens in Asia, are based on small family operations in which there are no biosecurity measures, making it hard to establish strict control measures to limit those outbreaks. The population are scarcely informed about the risk and the measures to be taken to avoid it. All this invokes a high risk of human exposure to affected birds and high probabilities of emergence of human cases in these areas in relevant numbers.
>
> (SP/D/121, 2006: 28, translated by the author)

The lack of knowledge extends beyond laypersons, to people who interact with animals in a professional capacity – farmers in this case. It is implied that their professionalisation is of a lower level than the equivalent in Western countries: these people lack the proper expertise. Absence of separation between the professional and the lay field, in the form of 'family operations', is presented as a source of greater threat.

In addition, human populations affect pandemic spread through movement. A 'good' population from this standpoint seems to be a static and stable group, while moving populations are difficult to know and control. Two

specific examples wherein heightened risk of communicable diseases is linked to moving populations appeared in the material: mass gatherings (see document WHO/D/35, 2015) and refugees from humanitarian emergencies (see document WHO/D/18, 2012). In both examples, movement leads to higher population density, which presents an additional problem. Thereby, both mass gatherings and humanitarian emergencies require special treatment from the public-health perspective as they challenge normative conceptions of movement, location, and density. For example, when conversing with me, an epidemiologist working with the WHO characterised public-health work as always facing added difficulties when it has to be carried out in displaced-population camps. One factor is the need for mobile laboratories that can perform on-site confirmation work at the camps, but complication is added also by the camp's residents not having physical addresses. Workers' need to rely on GPS-based technologies to locate people (WHO/I/3, 2016: 26) is highly illustrative of spatial organisation as a field in which populations become a technical element to be governed.

The second role enacted by human populations is that of communications problem. As I argued in Chapter 6 when addressing this topic from a knowledge-distribution perspective, public communication has become one of the main challenges in the distribution of knowledge. Lay people might not be able to handle information about pandemic emergencies without panicking, so experts take charge of handling that information for them (FI/I/2, 2015). One conclusion is that populations must be kept in the dark for a proper public-health response. This contrasts against the idea that populations who lack certain knowledge might contribute to disease spread inadvertently. The challenge that follows, as expressed in the material, is to find the right balance, which allows institutions to carry out their work unchallenged while building a relationship of trust with the governed population (EMRO-EGY/D/181).

In endeavours to find this balance, creating knowledge about populations is relevant for knowing their attitudes and opinions. Populations need to be known and understood. Among the tools applied to that end are polls and surveys. Among the 'not-so-new'[54] lessons learnt from the Ebola crisis, the European Council counted the need to know how European populations react to knowledge and institutions:

> It is important to understand the perceptions, knowledge and behaviours of European citizens during a health crisis and the differences across segments of the population and countries. Failure to do so can lead to wasted resources, and unanticipated consequences such as spreading fear and loss of trust in the authorities. Qualitative

[54] The need for public engagement in pursuit of public health features among the 'lessons learnt' from each PHEIC, and the value of public engagement is quite evident from the analysis presented in Chapter 6. However, as I argued in that chapter, this lesson has featured in materials circulated in public-health spheres for several decades already with no sign of being productively incorporated into policies.

> data, polls and surveys are essential tools for achieving this understanding. These can be supplemented by analysis of traditional media, social media and online comments. Rapid analysis of such data will help communicators to identify gaps in knowledge and cultural barriers as well as false rumours, and thereby assist in crafting appropriate ERC [Emergency Risk Communications] strategies. This should include trusted messengers. The strategy should be subjected to evaluation and results should be shared with all stakeholders as necessary to refine the strategy.
>
> (EU/D/76, 2015: 20)

Here, populations appear as a technical element that the preparedness and response apparatus needs to take into account instead of an actor to enrol in the response. Via such framings, knowledge-making practices can have an effect in building communities (in this case, human populations) in a certain way. Most important from the perspective of this chapter, though, is that populations are elements that can be known in a systematised way.

Systems can vary greatly, and knowledge-making techniques might help to construct publics in diverse manners. Lakoff (2012) describes, for example, three types of public in relation to public-health emergencies: there can be a vulnerable public, a threatening public, and an ignorant public. Each must be dealt with in its own way. However, these publics are not intrinsically different but rather are differentiated in the process of producing knowledge about the. Indeed, Rommetveit and Wynne (2017) have suggested that it has become important to study how publics are imagined through important technoscientific policies and agendas. I argue that the pandemic preparedness agenda is one of these.

7.2.2 ANIMAL LIFE: THE WILD, THE DOMESTIC, AND THE PRODUCTIVE

The role of animal populations as presented in the material analysed is less focused on their behaviours and their agentic characteristics. Rather, they tend to appear as a sort of unfettered natural laboratory. In these natural laboratories, viruses find a space for exchange of genetic information with each other where they can mutate into new biological agents that may represent new biological threats. In depictions of this process, there is a line drawn between domestic and wild animals that has been crucial in defining how governable an animal population is. This division involves articulation of three distinct spaces where animals have challenged the boundary between vulnerable and threatening: domestic/productive spaces, the wilderness, and research laboratories.

The first set of spaces, domestic/productive ones, is occupied by those animals that play a role in our own collectivities. They are described as members of our society, for they provide economic sustenance and a source of livelihood for small families, big companies, and national economies. Said status makes them indispensable, whatever potential threat they may represent. They are important also as a source of food, which is one of the most feared transmission mechanisms. For example, a scientific news piece published by the journal *Science* discussed how, amidst the MERS-CoV threat, camels were suspected of being the main transmission source, especially in connection with their role in the food chain:

> One route [of transmission] could be unpasteurized camel milk, consumed widely in the Middle East; scientists at the U.S. National Institute of Allergy and Infectious Diseases recently showed that the virus is stable for at least 72 hours in raw camel milk [...]. Contaminated meat could also play a role. Another, less likely possibility is that the virus is transmitted through the air. Virus excreted by camels could cling to dust particles, for instance, and infect humans who inhale it.
>
> (Kupferschmidt, 2014: 458)

This excerpt illustrates the multiplicity of interactions in which an animal can spread the virus to human populations: milk, meat, and airborne transmission all are contemplated as possibilities for passing on MERS-CoV. Many of these animals are critical for the survival of families or can have a huge impact on fragile national economies (WHO/I/3, 2016), but pets too can represent a threat. The case of the dog Excalibur, which I referred to in Chapter 6, shows how animals can appear as both vulnerable and threatening, with the dominant facet depending on how they are enacted. In other words, they entwine with biorisk, biosecurity, and biocare practices simultaneously (Dicenta, forthcoming). The entanglement of risk, security, and care – in other words, the knot of dealing with lives that perform as both victims and vectors – often can lead to unpopular governance decisions connected to collective affective reactions that interfere with public-health responses.

As for wild populations, the relevance is made apparent in the ability to interact with domestic animals. Uncontrolled forms of life enter domestic breeding spaces and also get closer to human populations. For example, in the case of the spread of African swine fever, the virus is controlled with regard to Finland by the Finnish Food Safety Authority through the governance of wild boars and, especially, of any travellers possibly transporting wild-boar meat (see Figure 2). Among the events that they attempt to prevent or stop is the infection of local farming pigs. It is indeed important, as Lyle Fearnley (2013) has suggested, to keep wild animals separated from domestic ones for farming biosecurity purposes, but this is not an easy task. Frequently, challenges arise through practices such as what Fearnley (2015: 13) has called 'breeding

wildness' – wherein breeders raise, feed, and house birds that are allowed to roam freely because such 'wildness' adds value to them.

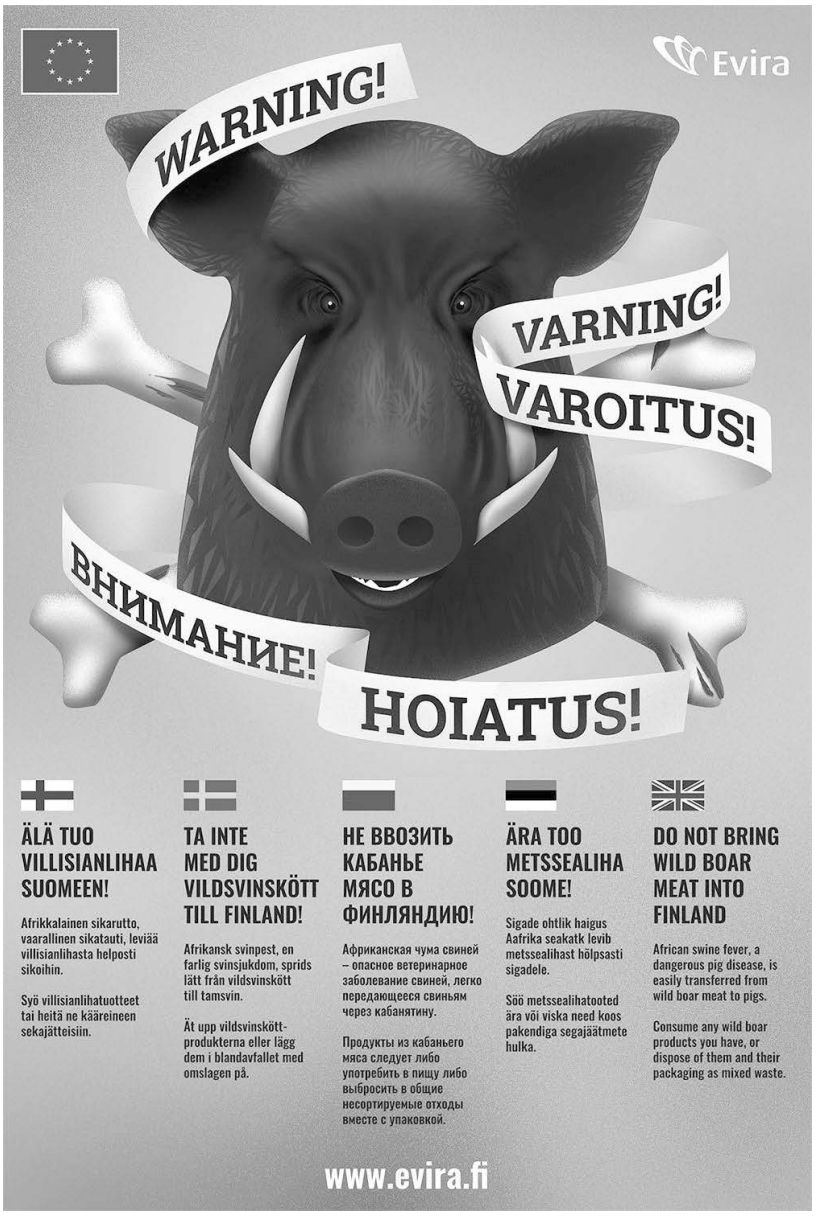

Figure 2 Materials from the Finnish Food Safety Authority campaign conducted in December 2017 in response to alerts about African swine fever spreading in the Baltic countries (the campaign was focused on regulating the movement of wild boars as the animal enabled the virus to reach farmed pigs in Finland)

In response, new surveillance strategies are emerging, with attention shifting from the efficient confinement and regulation of domestic animals to the surveillance of migratory (wild) movements (Verhagen, Herfst, & Fouchier, 2015). The study of migratory movements and the use of bird-watchers as sentinels (Keck, 2010; 2013; Lakoff, 2013; 2015b) allow creation of knowledge about birds that move freely. In the following excerpt from a brief note published by *Science*, three eminent influenza researchers, two of whom were authors of some of the controversial articles about the 'mutant flu', describe the relevance of moving the focus in influenza research towards migrating birds:

> The presence of HPAI H5 viruses in migrating birds and the dispersed spatial pattern of virus detections globally are worrisome; more poultry outbreaks could occur in the future, especially in countries that are ill-prepared. Despite the currently low public health risk, the outbreaks should be monitored closely, given that several animal species are susceptible and that influenza viruses are generally unpredictable. Wild birds covering multiple migratory flyways should be monitored for virus presence and for H5-specific antibodies as a cost-effective alternative to measure circulation of viruses of the GsGd H5 lineage. Control measures and research priorities aimed at eradicating HPAI H5 viruses from poultry populations should be redefined, as current strategies appear to be insufficient.
>
> (Verhagen et al., 2015: 616)

This excerpt suggests a shift from studying the circulation of viruses in farm populations to researching birds' migratory flyways. Thereby, migratory birds come to stand for the disease and occupy the focus of surveillance. Since certain populations – those that are not part of our collectivity – cannot be strictly governed, we must rely on observation and knowledge of their movement patterns. This relocation moves the laboratory to the field (Fearnley, 2015), rerouting the trajectories of knowledge production.

Finally, the value of the animal as research subject relies on its biological system, which can be used as a model for a human's. In the case of the 'mutant flu', ferrets were selected for the model in some experiments. The following excerpt from one of the articles published by a research group involved discusses the benefits of using ferrets as models for human–virus interaction:

> We chose the ferret (*Mustela putorius furo*) as the animal model for our studies. Ferrets have been used in influenza research since 1933 because they are susceptible to infection with human and avian influenza viruses. After infection with human influenza A virus, ferrets develop respiratory disease and lung pathology similar to that observed in humans. Ferrets can also transmit human influenza viruses to other ferrets that serve as sentinels with or without direct contact.
>
> (Herfst et al., 2012: 1536–1537)

In such cases, the animal's immune system is used as a projection of the human one as a way to create knowledge about the virus. In the process, vulnerability among humans and among animals get identified as similar at the molecular level and particular notions pertaining to virus–host interactions are put forward. However, even if the selection of these animals for models is well-motivated, some specific research artificialities may affect how the systems are found to be related to each other. Therefore, a challenge remains in conceptualising the similarities and differences in vulnerability between species. Each animal projection needs to be considered with its specificities. For example, the following excerpt from a news item published in *Nature* discusses possible biases in using monkeys in Ebola research:

> Testing vaccinated monkeys often involves exposing them to much higher levels of Ebola than humans typically encounter, so scientists may be overestimating the immune reaction needed to prevent infection, says Daniel Bausch, a physician at Tulane University School of Public Health and Tropical Medicine in New Orleans, Louisiana.
>
> (Callaway, 2014: 16)

The need to use high dosages of virus to carry out experiments successfully in the context of a controlled laboratory calls the validity of certain animal models into question. Such reflections serve as boundary work that builds differentiated species in research spaces. Furthermore, models are not approached merely with regard to the cold light of scientific rationality. Projections of a more affective or emotional character are found in technical laboratory guidelines, and animals in the research context evoke a moral identification that leads to certain practices designed to minimise their suffering. Where describing good laboratory practices, the WHO's current *Laboratory Biosafety Manual* dedicates some space to the treatment given to animals:

> Those who use animals for experimental and diagnostic purposes have a moral obligation to take every care to avoid causing them unnecessary pain or suffering. The animals must be provided with comfortable, hygienic housing and adequate wholesome food and water. At the end of the experiment they must be dealt with in a humane manner.
>
> (WHO/D/2, 2004: 28)

This conceptualisation of the animal as a model brings the animal a little closer to us, making it part of our collectivity as a form of life that can suffer and feel. Such a moral stance still prioritises the production of knowledge over the embodied experience attributed to the animal, though. As Brown and Michael (2004: 208) have said about experimentation with new biotechnologies in

animals, the animal 'bodies are much more than a means of rehearsing human biomedical procedures in preclinical trials; beyond models, they are the physical-corporeal basis of the therapy itself. It therefore prompts far-reaching questions about where the boundaries lie and to what extent animal and human regulatory functions can or should be merged'. This is what they call 'institutional species boundary change', whereby certain institutionalised species identities are challenged.

Much as Haraway's (1997) OncoMouse™ has, the ferrets and monkeys used in research for pandemic preparedness and response purposes challenge the boundaries that separate human from animal just as those boundaries are being established. Animals are resignified via their association with other living entities. Human and animal identities become tied together in complex sociotechnical assemblages wherein they are constructed as similar or different in light of their vulnerability to viruses. In these assemblages, their roles vary: they may sometimes be part of our collectivity as equals, sometimes uninvited wild guests that infect our productive and economic animals, sometimes models that are the only means of saving humans from a dangerous pandemic. We thus become, in one way or another, part of the same sociotechnical networks.

7.2.3 MOLECULAR LIFE: A THREAT ALWAYS IN THE BECOMING

Perhaps unsurprisingly, viruses are probably the most discussed form of life in the material. I consider this unsurprising because molecular forms of life – more concretely, viruses – are often seen as the entity ultimately responsible for pandemic outbreaks, usually giving each pandemic its own identity. Even if they do not 'act' alone, they still seem to take the leading role in giving identity to threatening assemblages. Accordingly, understanding how they are conceptualised and understood is key to uncovering how life is governed.

Their conceptualisation is complex enough to not always rely on narratives of threat and agency, of enemies that must be taken down by the forces of health. Viruses can perform other roles too and can even engage in protecting the collectives they normally threaten. If properly governed and controlled, viruses can aid in implementing the response to a pandemic, in developing vaccines, and in gaining a better understanding of transmission dynamics. In such cases, molecular life is presented as enrolled in the projects designed by expert assemblages, becoming a part of them. On the other hand, when it is not properly controlled, molecular life becomes a threat to vulnerable assemblages. In such cases, it comes to be represented by the figure of the biological agent, which can later become a pathogen or a bioweapon.

It is important to notice that, in these patterns, molecular life is always becoming and never completely devoid of threat. This is vital to my argument in this section. Even if biological material is described as controlled on account of biosafety and biosecurity measures, there is always a potentiality of such material, given the right circumstances, turning into a threat. Furthermore,

whether it is treated as enrolled or threatening is a result of how it engages with other social actors. In other words, the threatening potential is not an intrinsic characteristic of a given virus or biological agent.

The perceived relevance of molecular forms of life is very much influenced by new knowledge about genetic mutations and genetic engineering. Hence, while the Foucauldian diagrams directed focus to wider social interactions with human populations at the centre, current biomedical knowledge has allowed expanding the reach of how the governance of communicable diseases is understood and approached. As I have noted, this falls within the frame of the turn to the molecular in biopolitics suggested by Rose (2007): growth in our knowledge about molecular forms of life allows for new ways of governing it. The boundaries that define threat have already been established at the genetic level. A change in genetic make-up is all that stands in the way of a biological agent becoming pathogenic, infective, or lethal – and therefore threatening. Those boundaries of genetics need to be controlled at least as much as do territorial boundaries between countries or the boundaries that separate wild from domestic animal life.

I have mentioned that all molecular life forms depicted in the material always retain a certain capacity to become a threat. Here, I interpret this capacity as a form of nonhuman agency. In other words, when the agentic capacity of viruses is not undermined efficiently by pandemic governance, the threatening characteristics of the virus become more salient. When the viruses are under human control, their agency is not eliminated but is restricted by pandemic preparedness and response measures. That is the goal: the governance strategies are aimed at rendering molecular life passive, subordinate to human activities and submitted for our approval, such that it is not threatening. The distinction between the enrolled and the threatening virus is most visible in the context of the laboratory, where a virus can be isolated from its social engagements or at least such engagements can be managed in a controlled manner (as with animals' infection and forced transmission between them for research purposes). I will now proceed to discuss four ways in which molecular life is depicted in the material: as valuable, as controlled, as genetically mutable, and as subject to classification.

First of all, biological material can be more or less valuable, as dictated by its potential to aid in advancing specific sociotechnical programmes. As I have argued elsewhere (Cañada, 2013), viruses can gain positive or negative value, with the net result depending on their engagements with the various actors, be they well-intentioned researchers or bioterrorists with ill intent. Therefore, in the context of the laboratory, under proper governance, virus samples are something to protect and take care of. This is because of both their research potential and their potential uses in the wrong hands. In this context, even non-pathogenic samples may be of use. This extract from the WHO laboratory

biosecurity guidance describes the value and benefits that can characterise a virus:

> Non-pathogenic organisms have been used as hosts for genetic manipulations, scientists using widely accepted methods have created chimeric bacteria or viruses (in effect, GMOs). Therefore, nonpathogenic organisms that are deemed important should be protected against the risk of loss, carefully safeguarded and responsibly maintained.
>
> (WHO/D/8, 2006: 18)

It becomes visible here how the value of a sample is not necessarily determined by its pathogenic characteristics so much as by its ability to serve a purpose for the preparedness and response enterprise.

As for the second element, control, the material indicates that pathogenic agents should be placed under special scrutiny. Indeed, molecular life is controlled when it is submitted to defined guidelines. Even if guidelines are not available on every occasion (see the DURC examples in Chapter 5), some notion of good laboratory governance and responsible research remains. When these are applied, molecular life is rendered less threatening because of regulation and control. For example, in a Spanish document intended for giving recommendations to improve biosecurity measures, one way of rendering biological agents passive is to submit them to constant control when they are in laboratories:

> All movements of biological material and biological agents inside the facilities are registered, as well as their arrival and departure. It should be documented in written records what their location, use, and movement are at all times, along with the date and the origin and destination of those that arrive and leave the facilities.
>
> (SP/D/134, 2014: 22, translated by the author)

The occasions of transport and handling are especially sensitive and require added attention – it is important to be able to control life not only in the laboratory but also when it is leaving. Indeed, strict regulations exist to address how biowaste should be handled (WHO/D/8, 2006). Such documents make a clear statement that a sample that has ceased to be of specific value for research retains its pathogenic capacities. Getting rid of such samples means giving up control over them in the end, so protocols should be followed for somehow keeping the agent under control beyond the moment of disposal, either by removing its pathogenic capacities or by destroying the sample.

Thirdly, as I have clarified above, the pathogenicity of an agent is not stable. A non-pathogenic agent always has potential to mutate; something that is not pathogenic could become dangerous later. The conditions for this are varied. I have referred to the role of animals as natural laboratories that create the

necessary conditions for genetic exchange among different viruses, but the WHO laboratory biosecurity guidelines go further, extending the description to non-pathogenic organisms as always capable of turning pathogenic:

> Non-pathogenic microorganisms comprise the group of microbes for which no harmful health-related features are noted naturally. The term typically refers to organisms that are part of the normal flora colonizing specific biological niches and that performs beneficial functions for its host or environment or is not known to cause disease upon infection. Such organisms may, intentionally or not, acquire pathogenic features under natural or manipulated environments. Microorganisms from this group have been studied and selected representatives have become [...] unique strains, working strains, or strains with specific characteristics.
>
> (WHO/D/8, 2006: 17–18)

Reference to that capability for transformation from controlled molecular life into dangerous molecular life is one of the main ways in which viruses are depicted. In this way, biological entities become biological agents that have the capacity to act in a dangerous or threatening manner.

Finally, molecular life is presented as subject to classification in accordance with its lethality, infectivity, virulence, incubation period, contagiousness, and mechanisms of transmission (WHO/D/3, 2004). In line with these capabilities, they are assigned to different groups and encounter different types of governance measures. Such classification not only describes the pathogen but actually is normative, establishing the governance conditions that viruses ought to face in the laboratory. In other words, these taxa establish whether a pathogen should be handled in a more or a less secure and regulated environment (see Table 8).

7.2.4 THE HYBRID THAT THREATENS LIFE

Most narratives focus on the pathogenicity of the virus. That is, they associate the threat with how able the virus is to infect and to spread. I would argue, however, that the understanding and governing of the threat is actually a consequence of not the intrinsic characteristics of the virus but, rather, the hybrid associations in which the virus participates. In fact, those 'intrinsic' characteristics are ultimately determined by the hybrid associations. In a parallel to how laboratories render molecular life safe thanks to biosafety and biosecurity guidelines, other associations are what lead the public-health project to consider a virus more threatening or less so. The literature – namely, work by Hinchliffe et al. (2013) – has read those associations as Baradian intra-actions (Barad, 2007). Accordingly, the associations that result in biothreats must be understood not as extensions of the pandemic network but

as spatial intentions. In other words, the threat is born of the interactions instead of the interactions being a result of the threat.

Table 8: *Characterisation of the relationship between risk groups and biosafety levels, practices, and equipment (BSC = biological safety cabinet; GMT = good microbiological techniques), based on a table from WHO/D/2, 2004: 2*

Risk group	Biosafety level	Laboratory type	Laboratory practices	Safety equipment
1	Basic Biosafety Level 1	Basic teaching Research	GMT	None (open-bench work)
2	Basic Biosafety Level 2	Primary health services Diagnostic services and research	GMT + protective clothing Biohazard signs	Open-bench work + BSC for possible aerosols
3	Containment Biosafety Level 3	Special diagnostic services Research	As Level 2 + special clothing, controlled access, and directional air flow	BSC and/or other primary devices for all activities
4	Maximum containment Biosafety Level 4	Dangerous-pathogen units	As Level 3 + airlock entry, shower exit, and special waste disposal	Class III BSC, or positive-pressure suits in conjunction with Class II BSCs; a double-ended (pass-through) autoclave; and filtered air

Probably the most visible hybrid threat is the infected host. Animal-virus and human-virus hybrids are the most foregrounded examples of hybrid biological threats. Kezia Barker (2010) has referred to the interaction between humans and biological agents as a sort of symbiotic 'biosecure citizen'. The symbiont citizen described by Barker engages with entities of various kinds, such as viruses, seeds, micro-organisms in the soil, insects, and alien species, and thereby represents a biosecurity threat. Biosecure citizenship 'acts on the "dangerous" biological mobility enabled through symbiotic individuality' (Barker, 2010: 353), and it does so by focusing on the ability of those symbionts to be both threat and solution: a threat through the hybridisation processes and a solution by virtue of the exercise of responsible public participation – i.e., biosecure citizenship. For Barker, a secure relationship with biological threats consists of responsible engagement between population

and environment. I suggest that a similar conception of symbiotic relationship could cover relations with the non-citizen human and animal.

I would argue that, while the notion of biosecure citizenship seems excellent for describing the human-virus hybrid, such associations in the realm of pandemic preparedness should always be considered in a wider frame than that of citizenship also. In other words, the vulnerable and expert collectivities include much more than human agents. When examining how human and animal populations were presented in the material (discussed above), I found that many of the ways they were depicted opened a space for threatening interactions. Human populations can behave, move, and be concentrated in dangerous ways. Also, their amount of knowledge – in being either too high or too low – can become threatening. Animals can act as vectors, an especially dangerous role in the case of domestic and productive animals. Furthermore, interaction between domestic and/or productive and wild animals (that is, between enrolled and uncontrollable animals) can lead to new biological threats.

As animal and humans form hybrids with viruses, they acquire characteristics similar to the virus's; that is, they become threatening themselves. Hence, authorities need to govern and control them in order to counter their possible effect in their own collectivity – if that collectivity can still be deemed their own. The condition of animals and humans that become a threat is challenged, and their right to existence (in the case of animals) or free movement (in the case of humans) is called into doubt. I take my exploration of these hybrid threats further in the next section by discussing several instances in which pandemic response (whether virtual or actual) attempts to govern them and challenges their condition as vulnerable or threatening, victims or vectors. This helps me clarify the shape that those hybrids can take in specific cases and project how a new diagram of life and power is enacted through pandemic preparedness and response.

7.3 WHERE PREPAREDNESS MEETS LIFE: GOVERNING THE BOUNDARIES

I have now presented most of the core elements related to the areas of focus I presented back in the introduction: a governmental apparatus to counter the biological threat, a set of knowledge-making and knowledge-distribution practices for knowing the threat, and a hybrid biological threat that is conceptualised in the process. But what happens when these three elements intersect, when preparedness meets life in actual and virtual pandemic narratives? In other words, how does the fourth diagram emerge amidst threatening situations? Hinchliffe et al. (2013) have described how pandemic governance focuses on separating the healthy from the diseased. It does so,

they argue, by expanding the Foucauldian model of security to new spaces, reading communicable diseases from a topological perspective. In fact, however, the spatial separation sought with the government apparatus is based not so much on separating the healthy from the diseased as on separating the threatening from the vulnerable through the intervention of the preparedness apparatus. That is, the separation takes into account virtual narratives and the potentialities of the actors involved.

In this entanglement, it is the threatening that captures all the attention, for this is what needs to be weeded out from the dominant state of control of global health. In other words, global health is a securitised environment in which non-securitised – i.e., threatening – actors and spaces are not welcome. Hinchliffe et al. (2013) hint in this direction when talking about the Foucauldian notion of good and bad circulations; they understand a disease as 'an entangled interplay of environments, hosts, pathogens and humans' (2013: 532). The hybrids I have described are embedded in that interplay. In light of this, I think their argument can be taken further. **I argue that the pandemic enterprise is about far more than signalling the disease assemblages. What the project tries to do is signal *the threatening assemblages and their virtualities*. Therefore, in pandemic governance, sociomaterial and spatial barriers are constantly being laid out to separate the threatening (which includes the diseased) from the vulnerable (which includes the healthy).**

One of the most important parts of the picture is that many of the boundaries, barriers, and techniques to separate the threatening from the vulnerable are laid out virtually. As I explained in theoretical terms in Chapter 2 and then with empirical underpinnings in Chapter 5, preparedness takes over threatening assemblages through both virtual and actual implementations. Now, with this section, I want to address how the empirical material sets those boundaries, sometimes virtually and sometimes actually but always under similar logics, such that the vulnerable and the expert can be secure. Hence, spaces of threat and safety go beyond the geographical to enter sociomaterial pandemic networks where threat and vulnerability are understood biomedically, socially, technologically, and geographically.

Below, I will address those barriers, and their multilevel character through four examples. I start with how threatening assemblages are isolated in research settings. Secondly, I talk about travel hubs and how they have become hyper-securitised spaces that separate the threatening from the vulnerable. Health-care spaces are considered next, as places of encounters where the vulnerable and expert assemblages in health care are directly exposed to the diseased body. Finally, local spaces in day-to-day life appear as generally uncontrollable or variable spaces that have special characteristics. They might naturally benefit threatening or expert assemblages in consequence of particular social practices and traditions.

7.3.1 BIOSAFETY AND BIOSECURITY: BAD BUGS AND BAD PEOPLE

The laboratory is where molecularised life becomes most prominent. That it stands out most here does not mean that viruses are free of wider entanglements in this scenario. Rather, the assemblages they are a part of and the technical means whereby laboratories with a high biosafety level (BSL) are possible simply render virus assemblages safe.

In Chapter 6, I made brief reference to the biosafety-to-biosecurity shift in laboratory logics. This change in logics is visible when one looks at laboratory regulations, which exhibit a change in how and, more importantly, where the threat is situated. A review of biolaboratory safety regulations from before the IHR shows the threat being incarnate in the biological material inside the laboratory (see, for example, WHO/D/2, 2004; EU/D/1, 2000 at the transnational level; or SP/D/118, 1997 as an example of a national case). It was up to researchers and application of good practices to control that threat. The main objective under biosafety logics was to protect the worker from the dangers of working in a biolaboratory, with biothreats being conceived of as occupational hazards. The rise of biosecurity as a concern redirects the attention. The worker still needs to be careful, but now also the virus and society outside must be protected.

In this shift, a new threatening actor steps onto the stage, an outsider (or an insider-outsider if access is gained to the laboratory) in the form of a bioterrorist who might attempt to misuse the virus. There is a new victim also: a vulnerable society, susceptible to disruption created by an intentional or accidental release. In this shift, the threatened body moves from being the individualised one of the worker to being a collective one coupled with the institutions representing it – the population and the vital systems that support it (Collier & Lakoff, 2015). While, again, a clear-cut division does not exist and there is great overlap between biosecurity and biosafety, there is a shift in the way the threat is defined and localised in relation to the laboratory and the rest of the research assemblage.

This shift was summarised evocatively by one of my interviewees, who said that 'biosafety is about keeping bad bugs away from people [and] biosecurity is about keeping bad people away from bugs' (Interview, UK_01, 2015). Thus, in combination, biosafety and biosecurity focus on keeping dangerous biological agents inside the laboratory and ill-intentioned individuals outside it. The challenge could be described as being to avoid threatening assemblages between a dangerous pathogen and somebody who might, with or without intending to do so, take it outside and spread it to the world. This approach is designed to ensure that biological agents remain pathogenic, and therefore valuable for research, while society stays free of infection. I will illustrate this with three examples of threatening hybrids in research settings.

Firstly, as I mentioned above, biosafety regulations classify pathogens by their level of risk and laboratories in accordance with their biosafety level. In short, a riskier pathogen requires a safer laboratory. Hence, if a dangerous pathogen is handled and researched in a laboratory whose safety level is below that required, it becomes part of what could be called a threatening research assemblage. Although there is an established system of classification (see Table 8, in Subsection 7.2.3), newly acknowledged threatening assemblages can crystallise relatively often, since classification requirements can be tweaked.

For example, in one of the controversial 'mutant flu' studies, Masaki Imai and colleagues (2012: 420) replaced the 'multibasic HA cleavage sequence with a non-virulent-type cleavage sequence', allowing them to perform their study in a BSL-2 laboratory instead of a BSL-3 one. Cleavage is a key factor in determining the pathogenicity of the virus, and altering it alters the virus's risk level, in turn (Steinhauer, 1999). This case did not involve any threatening events arising but still elicited alarm in the biosecurity community. A case that did feature accidental release took place in 2014, after anthrax spores were deactivated in a BSL-3 facility so that they could be studied at BSL-2. The inactivation turned out to have been unsuccessful, and when these spores were shipped to other laboratories, some 84 workers were exposed to the deadly virus (Biosafety in the Balance, 2014). In this case, a supposedly threat-free assemblage was revealed to be threatening in an encounter with unsuccessful technical enrolment of the virus. The case also highlights that shipping is a delicate part of the process of keeping threatening assemblages under control. When viruses travel, they should do it in secure and safe ways. The technical means for this is to make laboratory regulations portable. Thereby, the safe and secure environment appropriate for laboratories should surround the shipment too, from authorisation and clearances to proper isolating packaging. Packaging and shipping protocols are presented, accordingly, as a way to provide both the virus and its surroundings with further protection. Figure 3 shows that different categories of risk require different packaging and identification. In other words, the boundaries that surround the threat and identify it as such must be movable and adapt to the differences among the spaces the threat occupies.

The third example is related to the mobility of researchers rather than of biological agents. As concerns related to ill-meaning researchers grow, the constant mobility of researchers between universities and laboratories has made background checks central. The background of researchers applying for certain positions must be carefully analysed by the host laboratory (EU/I/3, 2015). Here, a double identity as threat and non-threat appears. Though initially part of the expert assemblage, researchers must show themselves not to be potential threats. They must prove that they are part of the legitimate knowledge-making assemblage. Otherwise, they possess potential to act as bioterrorists and engage with viruses, forming threatening hybrids. Therefore, any researcher exchange could manifest an opportunity for threats to breach the secure/insecure boundary. However, boundaries remain constantly

challenged by mobility. The rules governing researcher mobility may be tweaked, and indeed laboratories differ in their rules for background checks. For example, a researcher who is not accepted to one laboratory might be able to work at another instead (EU/I/3, 2015).

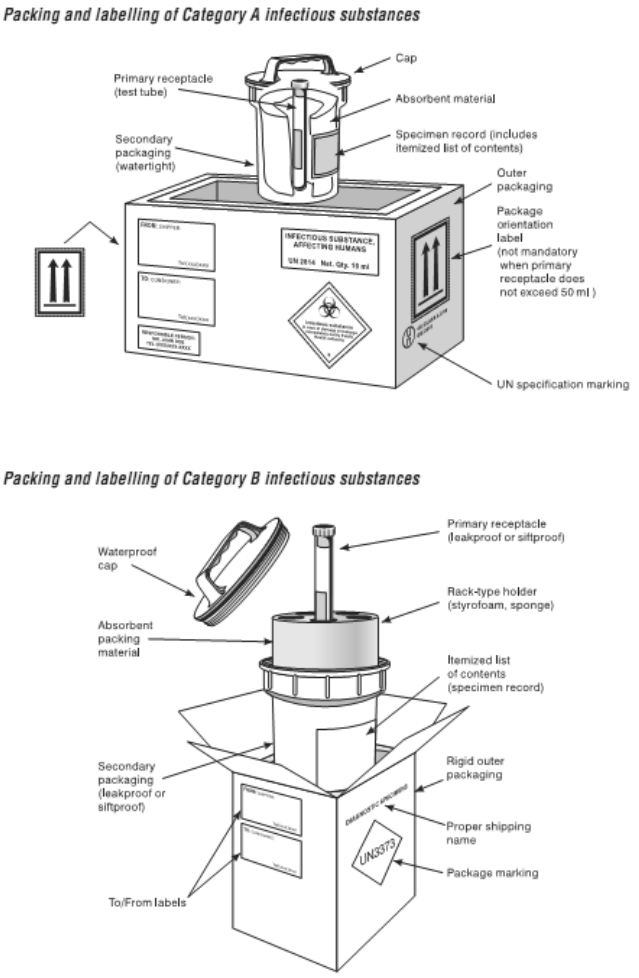

Figure 3 Examples of triple packaging systems (reproduced from WHO/D/02, 2004: 96)

7.3.2 TRAVEL HUBS AND LIMITATIONS TO MOVEMENT

The control of international travel hubs is especially relevant when an emergency has been declared in a certain region. As global connections can quickly increase the pace of the spread, travel hubs can function as a containment tool. This is especially true of airports[55]. Indeed, as security measures in airports have increased, it has become easier to track and control passengers. That said, airports remain both an opportunity and a threat, a threat because they are a door by which the local disease can become global but an opportunity in the vast space they offer for control. The concentration of a large number of individuals in this space can prompt worries yet allows testing many people in a single space at the same time and identifying potential or current threats there. In this process, travellers need to prove that they are neither victims nor vectors – in other words, that they are not part of the threatening assemblage. Airports are, in a way, obligatory passage points (Callon, 1984) that force the interests of the governmental apparatus, the traveller, and the threatening assemblage into alignment and submit all of these to the programme of pandemic response.

Airports work by producing a sort of funnel effect, which is illustrated in protocols for leaving Ebola-stricken areas during the emergency in West Africa. A protocol for exit screenings analysed during an EU/WHO review mission (EU/D/68, 2014) mandated the would-be passenger going through a full five screenings before finally being allowed to access the aeroplane. Here is a summary of the protocol:

1. On arrival at the airport, all persons (travellers, staff and other workers, friends, and relatives not travelling) should wash their hands in chlorine solution and have their body temperature measured with handheld infrared thermometers. People in vehicles must step out to be tested. If the temperature is above the established limit, entrance to the airport is denied.
2. At the entrance to the terminal, friends and relatives are no longer allowed. The routine is repeated, with hands washed in chlorine solution and temperature measured. Prospective departing passengers must fill in a Health Declaration Form (HDF). If the temperature is above the established limit, entrance to the terminal is denied.
3. Before check-in, primary screening is performed by trained health-care workers. Body temperature is measured, signs of illness are assessed, the HDF is reviewed, and follow-up questions are asked.

[55] Although spread could take place by means other than flights, airports remain especially relevant because of the speed and ease of travel they afford (Tatem, Rogers, & Hay, 2006). In contrast, unauthorised travelling is often seen as an unlikely way of spreading disease at the global level, having greater consequences at the stigmatisation level than in terms of actual pandemic spread (Ravi & Gauldin, 2014).

   a. If the temperature is above the limit set, the person in question is escorted to secondary screening.
   b. If the HDF is missing data, the relevant items need to be added. Also, information already filled in is confirmed verbally. The HDF is archived or given back to the passenger (this depends on the airport).
   c. An information sheet about Ebola is given to the passenger.
4. At the check-in desk, airline staff check the person's temperature, which then is recorded on a sticker in the passport or noted on the HDF for stapling to the boarding pass (if the patient still has the HDF).
5. At the boarding gate, body temperature is measured again. If it is above the established limit, the would-be passenger is denied boarding and escorted to secondary screening.

This example elucidates the airport's spatial organisation, handled through a series of consecutive barriers, from entrance to boarding gate, with a series of filters that allow threatening hybrids to be kept from accessing the global space. Here, the threatening, the vulnerable, and the expert assemblage all have a face-to-face encounter. The five-step procedure displays an apparatus of medical knowledge, government rules, health-care workers, measurement technologies, standardised forms, case definitions, and physical distribution designed to contain the spread of Ebola.

7.3.3 CONSTRUCTION OF ROBUST AND PERMEABLE BOUNDARIES IN HEALTH CARE

The third example is related to the way health care is organised in places deemed to be of heightened threat. Whether these are makeshift wards used in emergencies or hospital buildings proper, the logics of spatial governance show the same pattern: barriers should be built between the threat and the staff. In this arena, the work of Pallister-Wilkins (2016) has made visible the relevance of PPE (one of the main countermeasures stockpiled during stand-by governance, discussed in Chapter 5). This equipment forms a barrier that can protect health-care professionals from infection when they are treating the patient, the human-virus hybrid. As Pallister-Wilkins explains by means of the example of Ebola, the barriers offered by PPE are especially interesting because they should not be fully impermeable. While they should stop the virus from infecting the staff through bodily fluids, they should simultaneously allow other substances to pass through, such as the oxygen breathed by the health-care workers. In other words, PPE should stop bad circulations while allowing good ones, in the sense described by Hinchliffe and colleagues (2013). Similar logics are followed in how isolation wards and care

rooms are spatially arranged. They should allow circulation of caregivers, medicine, food, water, and oxygen but not of other vulnerable actors. In this case, the fact that no barrier can be constructed as hermetic contrasts with the classical logics applied in thinking about isolation and PPE.

Another way in which hospitals establish boundaries and barriers around the threat is through construction of temporal boundaries. Hospitalisation of patients allows not only arranging them spatially but also closely following the progress of the illness while temporally measuring the appearance and disappearance of symptoms and signs of disease. This information helps health-care professionals to organise patients and their discharge accordingly. For instance, advice given to health-care workers during the MERS-CoV outbreak recommended that people who had been to areas of risk – or in contact with somebody who had – within the previous 14 days be separated from other patients in waiting areas, and that PPE be used in treatment of such patients (EU/D/63, 2013). Here, the history of a patient becomes a motor of risk. Past actions and behaviours crystallise in the current location, configuring a diseased body that needs to be governed as a potential threat.

For another example of temporal governance, one can turn to the various spans of time that are significant for governance of the threat: the time before symptoms are visible, the time of greatest infectiousness, the time it takes after treatment for an infected body to be considered healthy and non-threatening again, the time between release (intended or accidental) and the time of detection, etc. All of these are specifically defined time periods that aid in defining threatening forms of life and, crucially, determining the way of governing them spatially. For example, it takes 21 days for symptoms of Ebola to show, so until a person has gone 21 days without displaying symptoms, biogovernance measures must be in force: isolation and limiting of social relationships.

7.3.4 EVERYDAY SPACES OF THREAT

Laboratories, airports, and hospitals are examples of highly controlled spaces where threatening, protecting, and vulnerable assemblages can be distributed spatially in accordance with guidelines and regulations. Not all spaces can be subjected to this level of control. ‘Everyday spaces’ not directly organised in the context of the expert assemblage play their own role in the development of pandemic events. Since these spaces escape the control of the apparatus, they tend to be depicted with less detail in the documents. They are, in a way, marginal, othered spaces with local variability that cannot be fully regulated or even known. In the material analysed, I was able to find two examples.

Firstly, the division between rural and urban spaces is depicted as a natural boundary that keeps communicable diseases within the bounds of certain areas. The difficulty of accessing some areas appears to represent a good isolation technique, without any need for further intervention. The example of Ebola is highly illustrative. For decades, Ebola was typically found in rural

areas only as its high lethality prevented it from escaping its area of emergence. This means that outbreaks were generally isolated and self-contained. Then, the Ebola outbreak in 2014 brought about a change in perceptions, once Ebola managed to find its way to urban spaces. As a WHO expert in epidemiological investigations and I discussed, the identity of the threat was redefined as biological threat of international concern:

> So when it's confirmed that it's Ebola, everybody was (a little bit) surprised because Ebola had never been in that region, [...] the issue was dealt with normally [in] a remote place, [...] village or whatever hospital in a remote area and it's contained by geography already – no people go in, no people go out, by nature, not that they are isolated, but it will die out sometime. I mean it's hundreds of cases maximum. But now it's different: it went to cities, then it [boarded] planes, then to Nigeria.
>
> (WHO/I/3, 2016: 46)

Here, Ebola appears as a spatial event that emerges where it is unexpected. Natural geography was a useful tool for public-health governance, but its status has now changed. In an EC memo from 2014 reporting on the EU's response to the Ebola outbreak, the difficulties in reaching some of the rural areas where Ebola was spreading are cited as one of the challenges. While Ebola has become able to reach past the geographical barriers, the international response has failed to fulfil one of the main IHR principles and reach the source of the threat ('tackling at the source'):

> Limited access to some areas in the affected countries also complicates the registration and isolation of patients. Lack of medical equipment to isolate patients and protect medical staff presents a further challenge. The disease has already claimed the lives of more than 120 health workers.
>
> (EU/D/75, 2014: 2)

Here, rural landscapes play a double role as barrier, initially the barrier of isolation that keeps Ebola an endemic threat and later the barrier that keeps the source of the threat away from the intervention of the expert assemblage. In such ways, the everyday spaces occupied by people, rural and urban alike, play an important part in the development of a pandemic, whether or not those spaces are controlled by health authorities.

While the discussion above deals mainly with rural spaces, cities, as Meike Wolf (2016) has argued, are an important element in modulating the way pathogens and humans interact. Some of this importance is related to the dichotomy itself, with the divisions between the rural and the urban being reminiscent of those between wild and domestic birds that I described above

(Fearnley, 2013; 2015). I suggest not an analogy in which rural areas correspond to the wild and urban areas to the domestic but that these divisions are taken for granted as natural barriers that come to be noticed as permeable in the face of the challenges posed by public-health events. As animal epidemiologists are forced to redefine their concept of the wild and the domestic, so is the public-health enterprise forced to rethink the relations between rural and urban. Furthermore, since urban reach implies access to the global, this means redefining also the boundaries between local and global, in line with which threat is allowed to roam in some localities but not others.

With the second example regarding everyday spaces of threat, we can examine how gendered roles and practices can play a role in the way a virus spreads through specific portions of the population. This topic did not appear salient at all in the material. In fact, I could find only one document (WHO/D/9, 2007) directly addressing how gendered spaces and practices of day-to-day life affect the transmission of infectious diseases. This document, from 2007, considers sex and gender in relation to epidemic-prone infectious diseases and reviews both ways in which epidemics affect specific genders and how gender affects their spread. The gender narrative is to a certain extent absent from the field of public health (as are the rest of the othered narratives that I have been bringing up, throughout the thesis). I believe, as the 2007 document argues, that such patterns should receive more attention. One of the most illustrative examples supports the idea that (normative) gendered practices regulate exposure to disease and to treatment:

> Gender influences both patterns of exposure to infectious agents and the treatment of infectious disease. For example, gender roles influence where men and women spend their time, and the infectious agents they come into contact with, as well as the nature of exposure, its frequency and its intensity. Differences in the provision of health care to males and females, as well as in accumulated scientific knowledge about the effects of treatments, influence the course and outcome of disease for those who have been infected.
>
> (WHO/D/9, 2007: 4)

As this excerpt states, there are differences in how spaces are occupied and in how non-professional care is distributed. In other words, exposure to the infectious agents is regulated by gendered social norms. Indeed, research has shown that gender imbalances often exist in the provision of home and informal care. Most research reports offering more concrete examples in the context of epidemics have focused on the case of HIV/AIDS, wherein transmission is often articulated in terms of male power over sexual relationships and lack of education programmes (Harrison, Short, & Tuoane-Nkhasi, 2014). Furthermore, in gendered settings, older women seem to play a particularly strong role in care for family members with HIV/AIDS (Schatz,

Gilbert, & McDonald, 2013). It is worth highlighting the lack of studies exploring how rapidly paced epidemics might be affected by gendered care.

Geographical and gender divisions demonstrate that not all assemblages the threat takes part in are technologised assemblages regulated by the preparedness apparatus. Rather, the threat participates in everyday practices and spaces that may encourage the spread or stop it. Knowledge about such practices is part of what the use of social scientific outputs is an attempt to cover. As I argued in Chapter 6, the incorporation of these narratives into institutional perspectives remains quite unsuccessful, and, although lessons related to the relevance of local practices have been recognised by health authorities, those authorities have repeatedly failed to incorporate them.

7.4 VIRTUAL ASSEMBLAGES ON THE MOVE

When I visited the buildings where my informants worked, there were mechanisms that considered my own hybridity to ensure that I, my work, and my interviews all were compliant with biosecure practices, chiefly metal detectors and passport checks to guarantee that me entering the building did not pose a threat to the informants' organisations. I was thus governed in spatial terms (was I allowed to enter the building?) and in terms of my social engagements (did my background pose a threat of any kind?). These two elements are illustrative of the new Foucauldian diagram of life and power that I claim to be applicable. Through this chapter, I have argued that modern governance of pandemic threats is part of that diagram with its two novel elements.

Firstly, the diseased and the healthy – i.e., the circulations considered good and bad – have been redefined into virtual assemblages. Hence, we can now talk about threatening and vulnerable assemblages that should remain separate. These assemblages are much broader than those hybrids in which the disease itself is or is not present. Rather, if a social actor can be included in a virtual narrative that implies threat, said actor must be governed as potentially belonging to the threatening assemblage. If we focus the question on what lives are being governed in the project of pandemic preparedness and response, we find that the 'bio-' element in biopreparedness, biosecurity, and bioterrorism encompasses much more than the biothreat attributed to a pathogen. Rather, that pathogen engages with various life forms (gendered humans and animals) and with various non-living actors (planes, shipping technologies, geographies, and cities). What is governed is not a pathogenic biological entity or a population vulnerable to it. **What is being governed is the threatening and vulnerable assemblages that help spread or fight the pandemic outbreaks – whether virtual or actual. For bringing the threat to a halt, health response is directed to the**

interface at which the threat is visible in society: it taking over human and animal life.

Secondly, as knowledge about the threatening assemblages extends across levels of governance, **the boundaries and barriers that separate between threatening and vulnerable assemblages become multiple and movable**. Amidst attempts to propagate stand-by measures spatially, molecularly, and temporally, struggles to actualise preparedness in specific spaces emerge. This is true especially for 'uncharted' geographies such as those of non-Western countries, unknown viruses, unaccounted-for social practices, and out-of-reach geographies. In such cases, pre-emergency implementation is not only lacking but also often disconnected from local actualities. When stand-by governance measures are initiated, they encounter an actuality that had not been taken into account because that actuality had not been articulated in virtual narratives. Therefore, the boundaries that divide the threatening from the vulnerable need to be on the move constantly. They have to be actualised at different levels of abstraction and be able to adapt to the specific assemblages that the pandemic response is facing.

8 CONCLUSIONS

> *Today I presented the main outputs of my thesis project at the Saari Residence. I always worry when I present to a new audience. Will they understand what I say? Am I taking things for granted? Am I being too obscure? The conversation was quite lively afterwards, as lively as a discussion about pandemic threats can be. People asked about what individuals could do to make the world healthier, about access to biotechnology, about the use of genetically modified mosquitoes, about the role of islands in international spread. Each person who posed questions seemed to have a unique take on the issue; they all were attracted to the topic for their own reasons. Later, when talking to them as individuals, I saw that the questions each raised were related to their particular background, artistic interests, and worldview. All of them were incorporating the notion of pandemic threat into their worldview. They were reconstructing the threat, making it their own.*
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> *Saari Residence (Mynämäki), 17 October 2017*

The Saari Residence is in the Finnish municipality of Mynämäki, about 30 kilometres north of the city of Turku, in the south-west of the country. The old villa where the facility is located was purchased by the Kone Foundation in 2006 and turned into a residence for artists. They stay at the residence for two months at a time in groups of approximately eight, and one spot is reserved alongside them for a researcher. As a researcher funded by Kone, I had the opportunity to write my first draft at the Saari Residence in January–February 2017. Later in the year, in October, I was able to visit again for a week and write the final chapter of this dissertation, the one you are now reading. Both times, the staff at the residence asked me to present my work to the artists staying there. Preparing for the October presentation felt like a sort of culmination of my work. It prompted me to look back over the project and review what I had set out to do, how I did it, what did not go as planned, what obstacles I had found and dealt with, what unplanned elements emerged during the research process, and the connections between how I first envisioned the thesis and what it ultimately became. This review forced me to try to remember how it felt to think about pandemics and STS for the first time, before I became disciplined in this way of thinking. It took me back to Charles de Gaulle Airport in 2009, then forward through how all the elements that made me anxious there have slowly come together over the years.

The meta-narrative with which I marked the start of each chapter formed part of my reflection process. It helps to show the preparedness process

mirrored in my research and, thereby, elucidate how my position as a researcher conditions the way I read, think about, and understand this thesis. I started the introduction by describing the impact the H1N1 pandemic had on me: the airport, the people surrounding me, the information I received, and the institutional messages promulgated. As I became part of the academic community, the way I understood those elements changed while my position as a researcher simultaneously became concretised and crystallised. For my final presentation, my challenge was to bring the audience along on that journey in only 20 minutes. Fortunately, they took my research and made sense of it in relation to their respective positions as artists.

At this juncture, reflection on positioning is quite fitting. I have devoted a large part of this thesis to trying to point out a host of actors all positioned in specific ways in the pandemic context. With regard to general alignment, the narratives in the material analysed position them as expert, vulnerable, and/or threatening. The global health enterprise puts its own, considerable efforts into thinking and organising, so that once an emergency is declared, those actors involved can adapt to productive views of what a pandemic emergency is and how it should be responded to. In these efforts, it often finds that othered narratives of threat need to be enrolled. In the case of expert actors, the institutional conceptualisations of global threats are already well aligned, even in their multiplicity; that is, while being multiple, they follow similar logics. However, the expert view still clashes relatively often with narratives that are not so fully in line. I believe that if we are to understand how pandemic threats and pandemic response affect different lives, we must attend to the narratives of health that emerge not from global institutions but from the spaces of threat that those institutions aim to govern.

As I present my conclusions, I want to emphasise again that the perspectives on governance, knowledge, and threat conceptualisation that I have discussed in this thesis are those expressed in a specific field of expertise: that of the institutional global health project. Although the global health definition of pandemic threat is probably not the only one, it is clearly dominant. That dominance positions it to have a stronger influence than other worldviews on the shape of the world we live in, on the boundaries, identities, and categories that we use to configure our realities – whether these are manifested at the actual or at the virtual level. It is important to note also that the dominance of these perspectives on global health threats is not undeserved. The history of public health is full of narratives of success, with the importance of hygiene programmes, the eradication of smallpox, and the fight against SARS being some examples. It is important to maintain a balanced awareness: as one of the most basic principles of STS reminds us, we should pay attention to stories both of success and of failure (Bloor, 1976). Indeed, the recent history of the global fight against pandemics is far from free of the latter, and with every PHEIC, the WHO has been subjected to harsh

criticisms (some of which I have brought up in the course of the thesis)[56]. The global health perspective on pandemic threats is certainly of special value for understanding and intervening in pandemic processes, yet one should bear in mind that many unheard narratives not only are relevant in their own right but help shape and constantly interact, interfere, and engage with the institutional interventions that have the lead role in the thesis.

The stakes involve a need for a more ethical account of pandemic threats that both considers and engages with those who suffer through them and that makes possible a better-informed response from those possessing the resources to carry it out. There are two objectives behind this advocacy of acknowledging othered narratives of threat. Firstly, this recognition serves as an ethical imperative: if the way threat is conceptualised and responded to within the global health enterprise has an effect on day-to-day life, the conceptualisation must be done in an ethical manner. Socially constructing reality through identities, assemblages, boundaries, and borders should be a socially responsible activity. Secondly, an efficient preparedness enterprise has to consider otherness for reason of encountering it constantly. Incorporating non-dominant worldviews into the picture would contribute to better-informed preparedness and response mechanisms that are more aware, more engaging, more participative, and more communitarian. Fighting disease must not be left solely to experts; it needs to be a matter for all. Work to construct biosecure citizens (Barker, 2010) needs to include an initial component of listening to those citizens while also attending to the animal and virus engagements of which we humans are a part.

With my plea for more ethical and engaged accounts of pandemic threats, I argue that the way global health work orders the world, defines threat, and acts on it can be understood in terms of Baradian agential cuts (Barad, 2007): ways of dividing, organising, and categorising the world for which we are responsible[57]. The ways we describe the world thus advance a vision of the

[56] I should stress that I do not evaluate the performance of the WHO myself. Rather, in this context – as I have throughout the thesis – I refer to some of the public discussion that has taken place via various media, in international arenas, and in the scientific community during international emergencies.

[57] Barad's concept of the agential cut is a key part of her formulation of ethical knowledge-making. When we observe certain phenomena, through the use of certain instruments of observation, we conceptualise how the given phenomenon emerges at the crossroads of where it is situated, the instrument, and our entanglement with that phenomenon. In other words, we establish cuts in agency and identity for all elements involved and the assemblages that result therefrom. These cuts, for Barad, are intimately tied to ethics: since they are intrinsic not to the object observed, the instrument, or the observer but to the practice of observation, we are continuously responsible for the way we configure the many elements that feature in the knowledge we make.

world that is real, they establish boundaries of division, and they describe and categorise the world. When we get involved in making such cuts, when we exercise our opportunities for action in certain ways, we should make the choice knowingly since the cuts always have ethical consequences of unforeseeable reach. The examples of Yeli Sanda (in Chapter 6) and Excalibur (in chapters 6 and 7) illustrate the effects that differences in worldviews and understandings of threat furthered by political decisions and health interventions can have on day-to-day life, but they are also reminders of how those non-normative understandings can hamper the implementation of pandemic response.

To formulate this conclusion, I divide the chapter into three sections. I begin with a summary of the institutional pandemic narrative, in which I describe three main assemblages on which most of the empirical material relies: a threatening, a vulnerable, and an expert assemblage. While these assemblages will be familiar to the reader from the preceding chapters, summarising them here might help to clarify how they emerge and how they are characterised. Secondly, I offer three theoretical conclusions that cut across all three analysis chapters, with a) the diagram of life and power that extends beyond human populations, b) a conceptualisation of the threat/vulnerable boundary as movable, and c) a definition of global health inequalities as based on the production of that boundary. Finally, I present the conclusion that, from institutional and academic perspectives, there is a need to listen to othered narratives of health and threat. Furthermore, those narratives need to be read from an intersectional perspective.

8.1 MORE-THAN-HUMAN ASSEMBLAGES

One of the central elements of this thesis has been the call for a more-than-human approach to social sciences (Whatmore, 2006). This approach has emerged organically from my arguments and from the ways in which processes of boundary-making, categorisation, and identification take part in pandemic preparedness and response. In unfolding the argument, I referred mostly to three distinct more-than-human assemblages: the threatening, the vulnerable, and the expert, which I saw recurrently emerging as relevant in the body of material analysed. Of course, there could be more, and why not? My analysis could have directly approached alternative, localised, or lay narratives of health and threat. The three main identities found linked to the actors in my analysis are directly connected to the type of narrative I have chosen to look at: A Western technoscientific and institutional one made global. Such narratives are of special importance in that they are produced in spaces of power and authority. Consequently, they have a strong impact on those actors that are identified as threatening, vulnerable, or expert.

These assemblages coalesce around notions of threat and protection, bound up in a sort of pandemic 'us and them' narrative. However, more-than-

human identities do not sit comfortably amid traditional dualistic conceptions. Rather, such a dichotomous vision falls prey to the boundaries and distinctions drawn by expertise – the agential cuts (Barad, 2007) that shape the assemblages and apparatuses in pandemic threats. The expert assemblage divides in two the collectivity that it tries to protect, with the preparedness apparatus being constructed in contrast against it as an authoritative source of knowledge and governance, able to handle threat and sensitive information. Yet the infrastructures that make protection possible should be protected too. Accordingly, in the construction of threatening realities, there are always notions of threat, vulnerability, and expertise that aid in identifying the potentialities and characteristics of relevant actors in situations of pandemic threat. Even though such identities are not the only relevant ones, they seem to be especially present in the material I analysed.

In relation to other possible identities, it is important to note, as I will expand upon later in this chapter, that the identification of threatening, vulnerable, and expert collectives results, in fact, from intersectional relationalities. The analysis made it clear that categories and identities of threat, vulnerability, and expertise are constantly intertwined with other categories and identities, which may not feature as the main ones in institutionally narrated pandemic processes: nationality, species, gender, language, wealth, training, and access to knowledge play an important role, as some of the examples analysed illustrate. They are part of a wider social context that is key to producing the conditions of possibility and belonging for those various assemblages. With regard to the empirical material, constructing these three assemblages allows construction of three imagined communities (Anderson, 1983) in the sense I described at the end of Chapter 6. However, identification processes go beyond the identities and categories imagined by the institutional and technoscientific assemblages. The members of each of these are conditioned by the possibilities afforded by their particular background, their respective positions, and how those possibilities mesh with each other. Let me now summarise the characteristics of the three focal assemblages, hint at the conditions that make them possible and productive, and discuss what it means to be identified (in fact, enacted) as a part of each of them.

- The expert assemblage

The expert assemblage is the usual acting subject portrayed in the empirical material, although it very often is able to act upon itself for the sake of self-improvement through planning cycles, implementation assessments, or co-ordination agreements (see chapters 5 and 6). This is the community on which I focused the collection of my empirical material: experts, policy-makers, and scientists. Also components of this assemblage are the

technologies used, with automated surveillance, medical countermeasures, PPE, and laboratories being some examples. It is delimited through the production and distribution of knowledge. As I discussed in Chapter 6, producing and distributing knowledge helps to shape an epistemic community that is built as an authority on a certain matter. Hence, the pandemic preparedness community can be identified as such because it has a right to access, produce, and distribute knowledge. The leading role of the expert assemblage emerges from getting to put forth the narratives for the threatening and vulnerable assemblages. In other words, the 'experts' get to build, create, and produce the futures (Novas, 2008) in which threat, vulnerability, and protection are going to be entangled via biosocial relations. It is already abundantly clear that this is not a story of equality but a tale wherein narratives of threat are built by dominant and normative expertise.

- The threatening assemblage

The threatening assemblage is a highly diffuse and uncertainty-imbued assemblage, mostly on account of the generic way in which biological threats are defined. Indeed, as Lakoff (2008) has pointed out, this way of defining biological threat is what led to a need for biopreparedness. The expert assemblage's strategies and practices – often formulated in **stand-by** terms – result from this very lack of a concrete threatening assemblage: emergency measures cannot be fully defined until a biological threat is actualised. Membership of the threatening assemblage comes about from sociotechnical engagements that determine the level of threat ascribed to a given hybrid by means of assessments by the expert assemblage. Virus-human and virus-animal hybrids are perhaps the most visible threatening hybrids. However, it is principally their engagement with technology or technically defined practices that can render them more or less threatening. Genetic engineering, use of transport, natural mutations, biosafety and biosecurity measures, medicines, and vaccines are some examples.

- The vulnerable assemblage

Thirdly, the vulnerable assemblage includes those that can become victims and vectors. Although needing to be protected, they can easily turn into threatening actors, which might need a form of care that at the same tame protects the rest of the population. These actors are often identified as human and animal populations that could be affected by a biological threat. The definition of this assemblage inscribes an important line of interiority and exteriority for the expert assemblage. Although the vulnerable thus is essential to the construction of the expert assemblage with regard to exteriority, the elements of this assemblage can sometimes become partial members of the expert one. Vulnerable actors are often presented as technical elements of the public-health response, with their knowledge, worldview, behaviour, and

location all being elements to be known so that the pandemic response can be implemented without interference. The partiality is evident in that human populations must be engaged and enrolled in pandemic response to only the extent that allows them to feel safe, the appropriate biosecure practices to be carried out, and collective affective responses not to ensue. Animals, in turn, are an important component of this assemblage because of their productive value. At the same time, that productivity does not outweigh the risk when productive animals might represent a threat. Included in the vulnerable assemblages are also viruses, knowledge, laboratory facilities, and infrastructure that support the expert assemblage yet could be turned into threatening elements if engaged toward nefarious ends.

These three categories become effective and productive as they are defined and intersect with the identities and features of the various social actors involved in pandemic processes. It is important to also note that these assemblages are not symmetrical. Although this might seem obvious to some readers, it is essential to my argument that it is made explicit. First, the issues of power that I have pointed out throughout the thesis in relation to the expert assemblage make it able to identify and categorize other actors according to its own priorities. Second, although I just mentioned the potentiality of each actor to become part of each assemblage – at least virtually –, the reversibility between the vulnerable and the threatening stands out more visibly throughout the thesis. In other words, the expert assemblage exercises more ability at self-stabilisation than at stabilising others.

This has consequences for the actors that become part of each assemblage and the categories and identities that they participate in since this affords the application of certain governance strategies, whether the objects are human or not. As I have already argued, the actors and other members of each of the assemblages are not necessarily confined to only that assemblage. In other words, membership of these communities is multiple, partial, and constantly becoming – irrespective of expert entities' attempts at stable categorisations. In fact, it is quite commonplace for an actor to be part of the threatening, vulnerable, and expert assemblages simultaneously, at least in virtual terms. Humans and animals can become both victims and vectors; researchers may act as knowledge-producers, irresponsible scientists, or bioterrorists; health-care workers can save lives and/or become threatening; and viruses can both infect and aid in finding a cure. Indeed, the three main identities in pandemic narratives are entangled to such a degree that they both exclude each other and make each other possible.

8.2 DIAGRAMS, BOUNDARIES, AND INEQUALITIES

Though the above summary is general in nature, I have chosen a specific way of presenting the three main assemblages referred to in this thesis and the conditions in which they emerged in my empirical material. I characterised the assemblages in direct connection with my main argument, that **in the international fight against pandemic threats and emergencies, notions of threat and protection are always at play**. **More concretely, many actors involved are characterised as threatening, vulnerable (i.e., in need of protection), and/or expert (i.e., able to protect) through boundary-making, categorisation, and identification processes via governance and knowledge-making.**

In this section of the concluding chapter, I try to take the argument further by discussing the synergistic dynamics that emerge when one understands pandemic processes in terms of assemblages and the three areas of focus of the thesis: governance, knowledge, and threat conceptualisation. These synergies are made explicit in the form of three conclusions, with various links to policy, theoretical, and empirical dimensions:

- A more-than-human diagram of life and power is applicable, connecting the governance and threat-conceptualisation dimensions.
- Secondly, it is useful to consider the portability and flexibility that characterise boundary-making related to pandemic threats. In these, all three areas of focus are inter-linked: governance, knowledge, and threat conceptualisation.
- Finally, there is merit in intersectional definition of the health inequalities around those portable boundaries. This ties in with knowledge and threat conceptualisation.

The aim with the elaboration below is not to repeat or summarise what I have already argued but to build on it, link the various analysis outputs to each other, and reflect on how the conclusions might be relevant for different audiences.

8.2.1 A MORE-THAN-HUMAN DIAGRAM OF LIFE AND POWER

Understanding preparedness in terms of a more-than-human diagram of life and power entails building on the three classical diagrams that Foucault (2008) formulated in his presentation of public-health responses to the plague, leprosy, and smallpox epidemics in his 'Security, Territory, Population' lectures. While responses to those three epidemics focused on the governance of human populations through application of various public-health strategies, the main characteristics of the fourth diagram emerge in public-health responses that go beyond the governance of populations. In other words, **preparedness means governing much more than populations**. **It**

means governing – through protection or control – wider vulnerable assemblages and the hybrid entanglements that threaten them. In this, the first conclusion is connected with governance and the conceptualisation of threat.

Firstly, a more-than-human diagram emerges in the reconfiguration of the object of protection under new preparedness logics. As Collier and Lakoff (2015) have argued, logics of security are not focused just on protecting populations anymore; rather, the stress is on protecting the infrastructure elements categorised as vital for the survival of society. This is manifested in the construction of a resilient stand-by apparatus that needs to keep itself operative in the face of chaos and disruption. The stand-by apparatus does this by organising technological and political devices for the governance of pandemic crises before the pandemic threat is even defined. In other words, many of the preparedness efforts are directed at a sort of meta-governance: governance of governance itself.

Secondly, the more-than-human approach also plays a role in how the expert assemblage defines and governs biological threats. In this light, what needs to be controlled is not just a pathogen or the populations affected but also the hybrids assemblages in which these participate. Indeed, those hybrid formations are what render the pathogen pandemic. Furthermore, the hybrid assemblages must be conceptualised in relation to their virtualities. That is, in conceptualising a threat and arranging the response measures to control it, there needs to be a projection of how the threat will be enacted in the future.

This conclusion becomes especially relevant at the crossroads of STS and biosecurity studies. One aspect of relevance is found in the way categorisation and identification processes are becoming virtual. It is no longer enough to do hard boundary work with classification systems and operate with efficient boundary objects to render the categories of threatening, vulnerable, and expert identifiable. In addition, the actors involved need to be projected into the future, so that they can be identified and categorised on the basis of their potential entanglements in virtual narratives of threat. The boundaries are, therefore, virtual and actual. Secondly, my analysis can inform how biological threats are defined and characterised in relation to their hybrid entanglements. Notwithstanding the expert assemblage continuing to regard the virus as the main threat, it is only through the virus's entanglements with wild and domestic animals, with infiltrated or non-compliant researchers, with irresponsible health-care workers and farmers, or with uneducated populations that it can be productively identified, categorised, and characterised.

8.2.2 PORTABLE, PERMEABLE, AND FLEXIBLE BOUNDARIES

The question of how boundaries are redefined was posed as central at the beginning of the thesis, and it has therefore informed the articulation of much of the empirical analysis presented. Not surprisingly, the second conclusion connects with the three areas of focus specified in the introduction. Throughout the discussion, I have used the ways boundaries are identified, produced, and enacted as a lens for presenting many of my empirical examples related to government institutions, the production of valid knowledge, and how threats are conceptualised. In most of those examples, **boundaries have appeared as constantly in the making**. **However, they did not seem to be simply unstable or dissolving. Rather, there was an effort to construct boundaries as portable, permeable, and flexible in order to deal with the uncertainty that characterises preparedness. The instability was part of how they were configured.**

From a governmental perspective, boundaries become flexible and are redefined in the light shed by institutional biosocial processes (N. Brown & Michael, 2004). The expert assemblage is formed through co-ordination agreements, international regulations, and bonding events that result in the formation of 'stand-by networks': loosely connected social networks that are ready to cohere in operations in the face of emergencies. The boundaries of the expert assemblage are flexible also in the sense that they can adapt to engagement of partial members. Educating communities in biosecure citizenship (Barker, 2010) and using biosecure, biosafe virus samples for research are two ways in which the expert assemblage involves initially non-expert pandemic actors. The boundaries of the expert assemblage obviously need to adapt if stand-by networks are to respond efficiently to emergencies.

Secondly, boundaries are constantly being remade also in the context of knowledge's production and distribution. In the preparedness context, there is a constant need to filter out irrelevant knowledge from the relevant or to identify risky knowledge that could be used to further pandemic spread. The boundaries that delineate 'valid' knowledge are produced in terms of the authority of the source in the case of EBS, in terms of risk-fraught genetic manipulation where GOF and DURC are concerned, with regard to epistemological and ontological logics in the domain of the social sciences, and in terms of linguistic access to knowledge-making – on account of the predominance of English in academia and other international arenas. These boundaries produced around knowledge-making practices help to determine which actors have a say in the development of global health agendas.

Thirdly, boundaries are growing more clearly mobile as space is arranged in a way that separates the threatening from the vulnerable. Pathogenic samples and diseased bodies move all over the world while enrolled in the expert assemblage or when vulnerable bodies need to access care in other countries or otherwise travel. In such cases, they need to be secure; i.e., their status as threat needs to be minimised as they go about their travels.

Biosecurity and biosafety measures for the shipment of hazardous materials, for the transport of infected health-care workers, and in the mobile laboratories in non-securitised regions of the world are examples of how barriers – always permeable and impenetrable at the same time (Pallister-Wilkins, 2016) – between the threatening and the vulnerable travel around the world.

The second conclusion is especially relevant for theorisation surrounding boundaries in the biosecurity domain. In pandemic processes, boundaries are not only constantly in the making; in fact, the boundaries are produced in such a way that they **should be** constantly remade. This is consistent with the way threats are conceptualised. If threatening actors are constantly becoming, always open to taking on different identities and entering other categories, the boundaries and borders applied to control them must adapt to them. In terms of biosecurity theory, this is an effect of the dominance of uncertainty and the preparedness turn. When threats were still understood as calculable and identifiable, boundaries could be established as a consequence of those well-defined objects of threat. In the face of uncertain, moving, and unexpected threats, though, the barriers that allow building secure and safe spaces have to be able to respond to uncertainty through flexibility and portability.

8.2.3 INTERSECTIONAL INEQUALITIES AROUND BOUNDARIES OF HEALTH

Throughout the analysis, I referred to prior literature that posits a wide array of inequalities in the way health is defined, tackled, enacted, and distributed around the globe (for example, Anderson, 2014; Berghs, 2016; Biehl, 2016; H. Brown, 2015; Crane, 2010; Hinchliffe, 2015; Pallister-Wilkins, 2016). The globality of global health might well not be as inclusive as the terms seems to assert in what Hinchliffe (2015) has called 'one world-ism'. Understanding global health as representative of health the world over usually contributes to a reductionist perspective on health. For Hinchliffe, the global is characterised not so much by a single homogeneous health and disease reality that covers all humans and animals as by patching together different health realities. **I wish to argue that many of those distinct realities are key elements in conceptualising threat and regulating access to the production and shaping of expert knowledge. Hence, threat, vulnerability, and expertise are defined intersectionally, together with other categories (those involving nationality, class, gender, education, etc.). This definition work contributes to the reiteration of existing health inequalities.**

For example, in terms of conceptualisation of threats, racialised spaces and spaces of poverty might become spaces of health threat (Bredström, 2006; Molyneux et al., 2011); gender identities may be entwined with processes of

association of women, men, or genderqueer communities with the spread of a specific diseases, as has often been the case with AIDS (Bredström, 2006; Fay et al., 2011; Parkhurst, Chilongozi, & Hutchinson, 2015; Pinto, dos Santos Fernandes, de Oliveira, de Matos, & Motta de Castro, 2015); migration issues and prejudices might follow upon identification of a disease with a specific region or state (Bautista-Arredondo, Servan-Mori, Beynon, González, & Volkow, 2015); and lack of access to education and knowledge may be connected with enactment of less safe/secure practices (Fay et al., 2011; Molyneux et al., 2011; Zhang, While, & Norman, 2012). While these connections might not be displayed in all health crises, they show how othered identities often are entangled intersectionally with categories of threatening, vulnerable, and expert. These entanglements lead to inequalities between collectives in ability to become part of healthier globalities and localities. In other words, **engaging in nonhuman interactions in secure ways is not equally available to all individuals or all populations**.

Furthermore, the intersectional dynamics affect ability to influence the production of global health agendas and knowledge from non-Western spaces. One question that arises is whether the priorities imposed by such agendas are the priorities of all the countries that officially take part in preparing them, notwithstanding unequal ability to influence them. In one of the interviews in Cairo, a medical epidemiologist with the WHO explained to me that the IHR were not always aligned with the priorities of non-Western countries, even though they were the most important agreement in global health at the moment. In some of these countries, establishing reliable health-care systems and eliminating malnutrition might well be a higher priority than preparing legal, regulatory, and physical infrastructure for handling diseases that have not yet been identified; i.e., in these spaces, threat takes shapes quite different from those given focus by global health-institutional ventures. This not only makes development of preparedness in non-Western countries difficult but also opens a new front in the domain of local public health while struggles remain on many other fronts. Indeed, a multi-front fight is not uncommon, whereby global health initiatives impose a strain on countries, especially in the first phases of implementation (Biesma et al., 2009; Parkhurst et al., 2015). As some authors have argued, many of the international interventions in the global South take place within post-colonialist frames, where discourses of risk and blame are associated with non-Western countries (Berghs, 2016; Hinchliffe et al., 2013; Pallister-Wilkins, 2016). Such framing calls into question notions of nature applied amidst the emergence of 'natural outbreaks'. For example, Wolf (2016: 965) has argued that 'infectious diseases are less of a natural disaster, but "emerge" alongside social structures and inequalities in housing, health education or financial resources'. Thus, the axes of inequality and the boundaries that surround threat constantly co-construct each other. Lack of access to knowledge and resources – where access is determined by the identity and the position of each actor – can reduce a region or population's ability to become secure, while the label 'threatening'

simultaneously imposes the burden of reaching often unrealistic health goals on that area or population. With such unreachable goals, the population or region is prevented from contributing to setting feasible research agendas that could contribute to progress towards becoming a healthier population/region.

The final conclusion is relevant from not only the practical angle pointed to above but also a theoretical perspective, for it shows how health-related categorisation and identification processes can be understood as intersectional. When diverse and multiple categories are at play, the way in which a given actor becomes entangled in them depends on previous categorisations and identities. It is relevant also from a policy-making perspective, in pointing to the need to attend to multiple conceptualisations of threat and to differences in needs from one locality to the next. When defining threat intersectionally, one must, before talking about upcoming biological threats, evaluate where threat has become endemic and associated with other categories (of nationality, gender, education, etc.). Conceptualising threats in the abstract obscures the need to understand and address very concrete threats.

8.3 BUILDING INTERSECTIONAL NARRATIVES OF THREAT

In this thesis, I have been combining empirical material, theoretical conceptualisations, and personal experiences. With the previous section, I attempted to summarise the relevance of my analysis and outlook on how pandemic threats are constructed through three specific theoretical conclusions that go a little beyond my analysis and, also, the realm of academia. This stretch is quite deliberate: they are intended to have a longer reach and enable contributing to a better way of dealing with and understanding health threats of pandemic potential. Now, in the final section of the thesis, I will try to take them just a bit further, so that I and the reader can start to imagine new spaces and ways in which global health threats can be approached. In this, I have the objective also of contributing to more institutionally oriented ventures.

As I have hinted at several times throughout these concluding thoughts, I would argue that the identities and categories involved during pandemic processes should not be built exclusively from places of technoscientific and institutional expertise. That is, they should not be formed purely in relation to technoscientific analysis of pathogenicity and molecular life or through the technical assessments connected with policy implementation. Rather, on account of their multiplicity, they should come from places of intersectionality (Brah & Phoenix, 2004; Crenshaw, 1991; Phoenix & Pattynama, 2006). For example, Anna Bredstrom (2006) has argued that an intersectional analysis requires theorisation that considers the various axes of domination. I posit

that the categories and identities for which I have provided empirical illustration are some of the axes of domination that create the conditions of possibility for defining specific actors and spaces as threatening.

I find intersectionality to open new doors and paths for understanding those emerging-yet-othered modes of knowing that are active in pandemic preparedness and response. Accordingly, I hope that what I have presented here creates a breeding ground for further thought, conditions for thriving of research focused on those emerging identities of health shaped intersectionally around identities to do with gender, class, nationality, species, training, and/or education. Some of these intersectionalities in institutional and technoscientific perspectives shyly emerged during my analysis while others might not have emerged at all. For the most part, the othered narratives that I found were deeply buried under dominant understandings of threat, vulnerability, and expertise. In other words, I was able to uncover them not because they stood out in the material but because glints from them peeked out in contrast against the repetitiveness of more established conceptions. Those narratives that find their way into the light from amidst the mass of technical governmental knowledge are, I think, crucial to understanding the ground on which institutional and expert approaches are built. Still, they remain buried.

Minority positions can be vital for building trust in science policy (Gaskell et al., 2005). Global health involves a large amount of science and knowledge-making that needs good public-engagement practices if it is to thrive. In other words, the STS framing I have relied on has not only enabled me to pay attention to dominant ways of identifying and categorising pandemic actors but has also let emerge some identities and categories that were perhaps not so salient. Those othered narratives may be key for preparedness implementation. I believe that intersectional understanding of the health engagements during pandemics can give space in which those other narratives and identities could come through. As Lisa Bowleg (2012) has argued, if we wish the project to succeed, we cannot rely on privileged institutional narratives of health experiences in oppressed communities. Hence, it is important to compass and engage with those alternative narratives and what has been experienced in areas facing stigma and oppression. I echo Bowleg's argument for intersectionality as a valuable tool for public health, finding that intersectionality is of value for addressing how othered and localised narratives of global health are conceptualised (and how they may be marginalised) in local spaces. In today's dynamics, **threatening identities are constructed through power relationships wherein science, technology, and institutions are constructed as privileged positions**. **Populations, regions, spaces, genes, species, genders, individual researchers, workers, and health-care systems get categorised as threatening or secure not in line with their intrinsic identities but through intersectionally constituted and socially**

constructed[58] notions of threat that are embedded in complex networks of power and governance. When entire (animal or human) populations, countries, regions, communities, or assemblages become trapped inside spaces of threat, that situation not only influences how the preparedness apparatus looks at and governs them but also affects how the rest of the world understands them and, still more importantly, how they understand themselves. **In their relegation to a role of technical elements of the preparedness apparatus, their local knowledges, experiences, and voices – so vital for the fight against pandemic threats – are marginalised or, at best, appropriated by more powerful actors. I argue that they need to have a voice that is heard.**

It is important to highlight that pursuing this goal does not entail inundating the technical and the scientific with the emotional and the lay, or denying existing tools' technical validity. The technical and scientific systems of knowledge have a raison d'être and a purpose. Rather, the issue is of integrating otherness into dominant modes of thinking and knowledge-making – or **epistemes**. This is about looking at alternative modes of knowledge, from the social sciences, traditional knowledge, post-species thinking, and gender and post-colonial studies, as valid and as offering worldviews that can benefit understanding and interacting with realities, experiences, and behaviours. Through this approach, we may be able to avoid finding 40 years from now that the same 'lessons learnt' are still to be learnt. A different perspective might yield new things to hear about how diseases spread throughout communities – whether those communities are in West Africa, Beijing, or Paris. **This is a matter of making the much-hyped interdisciplinarity not a game of unbalanced international partnerships (H. Brown, 2015) but an endeavour to turn interdisciplinarity into transdisciplinary enterprises wherein different knowledges are equally welcomed and recognised.** Accordingly, the challenge is not to render a complete picture of how pandemics emerge in the world but, rather, to render an **ethical** picture, by attending to the cuts, categorisations, divisions, and identities that we perform while producing authoritative and potentially exclusive knowledge. While many of the authors whose work I built on demonstrated strivings in this direction, the idea was entirely missing from some accounts, and its absence from institutional perspectives is especially noteworthy.

[58] It is important to note and remember, especially here as I reach the final part of this work, where I elaborate on the relevance and utility of my conclusions, that being constructed does not imply a lack of significance in our world. On the contrary, meanings and categorisations, as I have strongly argued, clearly have consequences for those who experience them (Bowker & Star, 2000; Crenshaw, 1991).

This message is not for policy-makers alone, although they are an important part of my audience. I think there are lessons here for a much wider audience, for all those who are affected by and concerned about pandemic threats, whether in actual or virtual manifestations. Indeed, responsibility for conceptualising pandemic threats in inclusive ways rests with all of us. Whether that goal is reached depends on all who take an interest in the topic, write about it, or otherwise contribute to co-producing it in its multiplicity: policy-makers, researchers, scholars, journalists, engaged publics, farmers, artists, and anybody else the reader might think of. Mine is not a claim that everybody should actively decide on how pandemic threats are responded to. Rather, I assert that **people who are interested in how pandemic threats are responded to have a responsibility for the effects of their own knowledge and governance practices**. Accordingly, they should make efforts to listen to those who, even if their lives are constantly affected by the apparatus, lack access to it or do not have the time or conditions of possibility for exerting an influence on what we do in the public-health domain. By listening to othered narratives of disease, we can start to build the largely unavoidable boundaries in a way that recognises variability. Hinchliffe (2015) suggests that we attend to the dynamism and polymorphism that underpins a sense of more than one health, more than one world. By accepting that sense and following where it leads, we might start to turn that sense or feeling into something more concrete. If we understand global health threats intersectionally, we can build a field of global health that, instead of protecting one world and one health, protects our many worlds and our many healths.

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ANNEXES

ANNEX 1: LIST OF DOCUMENTS ANALYSED WITH ATLAS.TI

The list below includes all the material analysed by means of ATLAS.ti apart from scientific articles, which are referenced with standard academic conventions. Throughout the thesis, reference to this material employs the following system: 'Family/DocumentType/DocumentNumber, Year: Location'. Accordingly, an excerpt from page 123 of document 1 would be referenced with 'WHO/D/1, 1986: 123' and an extract from an interview would follow the same pattern but with an 'I' substituted for the 'D' and the last number indicating the excerpt.

Some of the documents were provided to me personally under a confidentiality agreement. Although they have been analysed, no direct quotations are used. In the following list, their name and source are redacted.

- WHO

No.	Year	Name	Type	Page	Last access	Source
1	1986	Public Health Action in Emergencies Caused by Epidemics	Practical guide	298	24/5/2018	http://apps.who.int/iris/bitstream/10665/40721/1/9241542071.pdf
2	2004	Laboratory Biosafety Manual – Third Edition	Manual	186	24/5/2018	http://www.who.int/csr/resources/publications/biosafety/en/Biosafety7.pdf
3	2004	Public Health Response to Biological and Chemical Weapons	Guidance	357	24/5/2018	http://www.who.int/csr/delibepidemics/biochemguide/en/
4	2005	Communicable Disease Control in Emergencies: A Field Manual	Manual	301	24/5/2018	http://apps.who.int/iris/bitstream/10665/96340/1/9241546166_eng.pdf
5	2005	International Health Regulations (second edition)	Regulation	82	24/5/2018	http://apps.who.int/iris/bitstream/10665/43883/1/9789241580410_eng.pdf
6	2005	National IHR Focal Point Guide: Designation/Establishment of National IHR Focal Points	Guide	6	24/5/2018	http://www.who.int/ihr/English2.pdf
7	2005	WHO Global Influenza Preparedness Plan	Prepared-ness plan	53	24/5/2018	http://www.who.int/csr/resources/publications/influenza/WHO_CDS_CSR_GIP_2005_5.pdf

No.	Year	Name	Type	Page	Last access	Source
8	2006	Biorisk Management: Laboratory Biosecurity Guidance	Guidance	41	24/5/2018	http://www.who.int/csr/resources/publications/biosafety/WHO_CDS_EPR_2006_6.pdf
9	2007	Addressing Sex and Gender in Epidemic-Prone Infectious Diseases	Paper	46	24/5/2018	http://www.who.int/csr/resources/publications/SexGenderInfectDis.pdf
10	2009	Toolkit for Implementation in National Legislation (the national IHR focal point)	Toolkit	55	24/5/2018	http://www.who.int/ihr/Toolkit_Legislative_Implementation.pdf
11	2010	External Review of WHO's Response to the H1N1 Influenza Pandemic	Speech	3	24/5/2018	http://www.who.int/dg/speeches/2010/ihr_review_20100928/en/
12	2010	Responsible Life Sciences Research for Global Health Security	Guidance	69	24/5/2018	http://apps.who.int/iris/bitstream/10665/70507/1/WHO_HSE_GAR_BDP_2010.2_eng.pdf
13	2010	Social Mobilization in Public Health Emergencies: Preparedness, Readiness and Response	Informal consultation	29	24/5/2018	http://apps.who.int/iris/bitstream/10665/70444/1/WHO_HSE_GAR_BDP_2010.1_eng.pdf
14	2011	Director-General Responds to Assessment of WHO's Handling of the Influenza Pandemic	Speech	4	24/5/2018	http://www.who.int/dg/speeches/2011/ihr_review_20110328/en/
15	2011	Pandemic Influenza Preparedness Framework for the Sharing of Influenza Viruses and Access to Vaccines and Other Benefits	Preparedness framework	68	24/5/2018	http://apps.who.int/iris/bitstream/10665/44796/1/9789241503082_eng.pdf
16	2012	Communication for Behavioural Impact (COMBI) Toolkit	Toolkit	126	24/5/2018	http://apps.who.int/iris/bitstream/handle/10665/75170/WHO_HSE_GCR_2012.13_eng.pdf?sequence=1
17	2012	Communication for Behavioural Impact (COMBI) (toolkit: field workbook)	Toolkit – Field Workbook	52	24/5/2018	http://apps.who.int/iris/bitstream/10665/75171/1/WHO_HSE_GCR_2012.14_eng.pdf?ua=1

No.	Year	Name	Type	Page	Last access	Source
18	2012	Outbreak Surveillance and Response in Humanitarian Emergencies	Guidelines	71	24/5/2018	http://apps.who.int/iris/bitstream/10665/70812/1/WHO_HSE_GAR_DCE_2012_1_eng.pdf
19	2012	Rapid Risk Assessment of Acute Public Health Events	Manual	44	24/5/2018	http://apps.who.int/iris/bitstream/10665/70810/1/WHO_HSE_GAR_ARO_2012.1_eng.pdf
20	2013	Emergency Response Framework (ERF)	Frame-work	51	24/5/2018	http://www.who.int/hac/about/erf_.pdf
21	2014	Early Detection, Assessment and Response to Acute Public Health Events	Guidance	64	24/5/2018	http://apps.who.int/iris/bitstream/10665/112667/1/WHO_HSE_GCR_LYO_2014.4_eng.pdf?ua=1
22	2014	Ebola and Marburg Virus Disease Epidemics: Preparedness, Alert, Control, and Evaluation	Strategy	107	24/5/2018	http://apps.who.int/iris/bitstream/10665/130160/1/WHO_HSE_PED_CED_2014.05_eng.pdf?ua=1&ua=1
23	2014	Ebola Surveillance in Countries with no Reported Cases of Ebola Virus Disease	Guidelines	2	24/5/2018	http://apps.who.int/iris/bitstream/10665/134581/1/WHO_EVD_Guidance_SurvNonECount_14.1_eng.pdf?ua=1
24	2014	Ethical Considerations for Use of Unregistered Interventions for Ebola Virus Disease	Consulta-tion report	12	24/5/2018	http://apps.who.int/iris/bitstream/10665/130997/1/WHO_HIS_KER_GHE_14.1_eng.pdf?ua=1
25	2014	Field Situation: Safe and Dignified Burial of a Patient Who Has Died from Suspected or Confirmed Ebola Virus Disease	Protocol	17	3/5/2016	http://apps.who.int/iris/bitstream/10665/137379/1/WHO_EVD_GUIDANCE_Burials_14.2_eng.pdf?ua=1
26	2014	How Can Science Inform Our Response to Ebola Virus Disease?	Consulta-tion	3	24/5/2018	http://apps.who.int/iris/bitstream/10665/137513/1/WHO_EVD_MTG_SCR_14.1_eng.pdf?ua=1
27	2014	International Meetings Attended by Individuals from Ebola Virus Disease-affected Countries	Guidance	12	24/5/2018	http://apps.who.int/iris/bitstream/10665/135751/1/WHO_EVD_GUIDANCE_MG_14.1_eng.pdf?ua=1
28	2014	Weekly Epidemiological Record 89(42) (on influenza vaccine preparedness)	WER	8	24/5/2018	http://www.who.int/wer/2014/wer8942.pdf

No.	Year	Name	Type	Page	Last access	Source
29	2015	WHO Strategic Response Plan: West Africa Ebola Outbreak	Response plan	28	24/5/2018	http://apps.who.int/iris/bitstream/10665/163360/1/9789241508698_eng.pdf?ua=1&ua=1
30	2015	Infection Prevention and Control during Health Care for Probable or Confirmed Cases of MERS-CoV	Guidance	5	24/5/2018	http://apps.who.int/iris/bitstream/10665/174652/1/WHO_MERS_IPC_15.1_eng.pdf?ua=1
31	2015	Investigation of Cases of Human Infection with Middle East Respiratory Syndrome Coronavirus (MERS-CoV)	Guidance	9	24/5/2018	http://apps.who.int/iris/bitstream/10665/178252/1/WHO_MERS_SUR_15.2_eng.pdf?ua=1
32	2015	Management of Asymptomatic Persons Who Are RTPCR Positive for Middle East Respiratory Syndrome Coronavirus (MERS-CoV)	Guidance	3	24/5/2018	http://apps.who.int/iris/bitstream/10665/180973/1/WHO_MERS_IPC_15.2_eng.pdf?ua=1&ua=1
33	2015	Surveillance for Human Infection with Middle East Respiratory Syndrome Coronavirus (MERS-CoV)	Guidance	3	24/5/2018	http://apps.who.int/iris/bitstream/10665/177869/1/WHO_MERS_SUR_15.1_eng.pdf?ua=1
34	2015	IHR Core Capacity Workbook	Workbook	65	24/5/2018	http://apps.who.int/iris/bitstream/10665/190819/1/WHO_HSE_GCR_2015.13_eng.pdf?ua=1
35	2015	Public Health for Mass Gatherings: Key Considerations	Key considerations	180	24/5/2018	http://apps.who.int/iris/bitstream/10665/162109/1/WHO_HSE_GCR_2015.5_eng.pdf
36	2015	Weekly Epidemiological Record 90(10) (on Ebola)	WER	8	24/5/2018	http://apps.who.int/iris/bitstream/10665/242330/1/WER9010.PDF
37	2015	Weekly Epidemiological Record 90(24) (section with MERS fact sheet)	WER	12	24/5/2018	http://apps.who.int/iris/bitstream/10665/242374/1/WER9024.PDF
38	2015	Weekly Epidemiological Record 90(28) (on influenza animal–human interface)	WER	16	24/5/2018	http://www.who.int/wer/2015/wer9028.pdf

No.	Year	Name	Type	Page	Last access	Source
39	2015	Weekly Epidemiological Record 90(32) (on laboratory response to the West African Ebola outbreak)	WER	16	24/5/2018	http://apps.who.int/iris/bitstream/10665/242402/1/WER9032.PDF
40	2015	Weekly Epidemiological Record 90(42) (on influenza vaccines pandemic preparedness)	WER	16	24/5/2018	http://apps.who.int/iris/bitstream/10665/254498/1/WER9042.pdf
41	2015	Weekly Epidemiological Record 91(01) (on influenza surveillance and detection)	WER	12	24/5/2018	http://www.who.int/wer/2016/wer9101.pdf?ua=1
42	2016	Progress Report of the Review Committee on the Role of the International Health Regulations (2005) in the Ebola Outbreak and Response	Report	12	24/5/2018	http://apps.who.int/gb/ebwha/pdf_files/EB138/B138_20-en.pdf

- EU

No.	Year	Name	Type	Page	Last access	Source
43	2000	DIRECTIVE 200054EC, on the protection of workers from risks related to exposure to biological agents at work	Directive	25	24/5/2018	https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32000L0054&from=EN
44	2001	Programme of Cooperation on Preparedness and Response to Biological and Chemical Agent Attacks [Health security]	Programme	7	24/5/2018	http://ec.europa.eu/health/archive/ph_threats/bioterrorisme/bioterrorism01_en.pdf
45	2005	On Strengthening Coordination on Generic Preparedness Planning for Public Health Emergencies at EU Level	Communication	13	27/4/2016	http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52005DC0605&from=EN
46	2007	Exercise Brown Lagoon	Simulation report	19	27/4/2016	http://ecdc.europa.eu/en/activities/response/Documents/ECDC_Exercises_Report_Brown_Lagoon.pdf

No.	Year	Name	Type	Page	Last access	Source
47	2007	Exercise Red Wing	Simulation report	17	27/4/2016	http://ecdc.europa.eu/en/activities/response/Documents/ECDC_Exercises_Report_Red_Wing.pdf
48	2007	Green Paper on Biopreparedness	Green paper	17	24/5/2018	https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52007DC0399&from=EN
49	2008	Consultation of the ECDC Competent Bodies for Preparedness and Response	Meeting report	19	24/5/2018	http://ecdc.europa.eu/en/publications/Publications/0810_MER_Competent_Bodies_for_Preparedness_and_Response.pdf
50	2008	Exercise Blue Triangle	Report	29	27/4/2016	http://ecdc.europa.eu/en/activities/response/Documents/ECDC_Exercise_Report_Blue_Triangle.pdf
51	2008	Synthesis of the Replies to the Green Paper on Bio-preparedness	Working document	59	21/4/2016	http://www.ipex.eu/IPEXL-WEB/dossier/document.do?code=SEC&year=2008&number=2374&extension=FIN
52	2009	Council Conclusions on Strengthening Chemical, Biological, Radiological and Nuclear (CBRN) Security in the European Union: An EU CBRN Action Plan – Adoption	Action Plan	83	24/5/2018	http://register.consilium.europa.eu/doc/srv?l=EN&f=ST%2015505%202009%20REV%201
53	2009	Exercise Orange Circle	Simulation report	20	27/4/2016	http://ecdc.europa.eu/en/activities/response/Documents/ECDC_Exercise_Report_Orang_Circle.pdf

No.	Year	Name	Type	Page	Last access	Source
54	2009	On Strengthening Chemical, Biological, Radiological and Nuclear Security in the European Union – an EU CBRN Action Plan	Communication	12	24/5/2018	https://ec.europa.eu/home-affairs/sites/homeaffairs/files/what-we-do/policies/pdf/com_2009_0273_en.pdf
55	2009	Report of the CBRN Task Force	Report	98	24/6/2013	http://www.ebsaweb.eu/ebsa_media/Downloads/Activities+_+Projects/Biosecurity+and+Biopreparedness/CBRNupdate02_02_2009/CBRN+TF+Report_20_01_2009.doc
56	2009	Vaccination Strategies against Pandemic (H1N1) 2009	Staff working document	10	24/5/2018	https://ec.europa.eu/health/archive/ph_threats/com/influenza/docs/flu_staff5_en.pdf
57	2010	Exercise Black Trapezium	Simulation report	32	27/4/2016	http://ecdc.europa.eu/en/activities/response/Documents/ECDC_Exercise_Report_Black_trapezium.pdf
58	2010	Commission Staff Working Document on Lessons Learnt from the H1N1 Pandemic and on Health Security in the European Union	Working document	7	27/4/2016	http://ec.europa.eu/health/preparedness_response/docs/commission_staff_lessonsh1n1_en.pdf
59	2010	The EU Internal Security Strategy in Action: Five Steps towards a More Secure Europe	Strategy	24	21/4/2016	http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52010DC0673&from=EN
60	2012	Progress Report on the Implementation of the EU CBRN Action Plan (public version)	Report	13	24/5/2018	https://ec.europa.eu/home-affairs/sites/homeaffairs/files/what-we-do/policies/crisis-and-terrorism/securing-dangerous-material/docs/eu_cbrn_action_plan_progress_report_en.pdf

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61	2013	Decision No 1082/2013/EU on Serious Cross-Border Threats to Health	Decision	15	24/5/2018	http://ec.europa.eu/health/preparedness_response/docs/decision_serious_crossborder_threats_22102013_en.pdf
62	2013	Statement on MERS-CoV Infection Advice with Regard to Travelling	Statement	3	24/5/2018	http://ec.europa.eu/health/preparedness_response/docs/mers_infotravellers2014_en.pdf
63	2013	Statement on Advice to Health Care Workers Caring for Patients with MERS-CoV Infection	Statement	2	24/5/2018	http://ec.europa.eu/health/preparedness_response/docs/mers_healthcare_workers_en.pdf
64	2014	Ebola Response: EU Scales Up Aid with Planes, Material Aid and Research Support	Press release	2	24/5/2018	http://europa.eu/rapid/press-release_IP-14-1462_en.pdf
65	2014	Ebola Virus Disease – Information for Travellers (Version 3)	Information	3	24/5/2018	http://ec.europa.eu/health/preparedness_response/docs/ebola_infotravellers2014_en.pdf
66	2014	European Union to Boost Ebola Research with €24.4 Million	Press release	3	24/5/2018	http://europa.eu/rapid/press-release_IP-14-1194_en.htm
67	2014	EU Ebola Response: Member States Send Additional Health Personnel to the Region	Press release	2	24/5/2018	http://europa.eu/rapid/press-release_IP-14-2440_en.pdf
68	2014	EU/WHO Mission to Review the Exit Screening Measures at International Airports in Conakry, Freetown and Monrovia	Technical report	5	27/4/2016	http://ec.europa.eu/health/preparedness_response/docs/ebola_20141208_sum_technicalreport_screening_en.pdf
69	2014	Joint Procurement Agreement to Procure Medical Countermeasures	Agreement	42	24/5/2018	http://ec.europa.eu/health/preparedness_response/docs/jpa_agreement_medicalcountermeasures_en.pdf
70	2014	Medical Countermeasures That Could Be Procured in Common under the Joint Procurement Agreement	Technical document	8	24/5/2018	http://ec.europa.eu/health/preparedness_response/docs/jpa_note_scope_en.pdf

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71	2014	Options for Preparing for Gatherings in the EU in the Context of the Current Outbreak of EVD in West Africa	Technical report	4	24/5/2018	http://ecdc.europa.eu/en/publications/Publications/preparing-gatherings-EU-ebola-outbreak-context.pdf
72	2014	Outbreak of Ebola Virus Disease in West Africa: 6th Update, 13 October 2014	Rapid risk assessment	20	16/10/2014	http://ec.europa.eu/health/preparedness_response/docs/ebola_riskassessment_en.pdf
73	2014	Outbreak of Ebola virus disease in West Africa: 7th Update, 17 October 2014	Rapid risk assessment	21	24/5/2018	http://ec.europa.eu/health/preparedness_response/docs/ebola_riskassessment_en.pdf
74	2014	Risk Assessment Guidelines for Infectious Diseases Transmitted on Aircraft (RAGIDA): Influenza	Guidelines	18	24/5/2018	https://ecdc.europa.eu/sites/portal/files/media/en/publications/Publications/influenza-RAGIDA-2014.pdf
75	2014	The EU's Response to Help Fight the Ebola Outbreak in West Africa	Memo	5	24/5/2018	http://europa.eu/rapid/press-release_MEMO-14-520_en.htm
76	2015	Conference 'Lessons Learned for Public Health from the Ebola Outbreak in West Africa – How to Improve Preparedness and Response in the EU for Future Outbreaks'	Conference report	28	24/5/2018	http://ec.europa.eu/health/preparedness_response/docs/ev_20151012_sr_en.pdf
77	2015	Council Conclusions on 'Lessons Learned for Public Health from the Ebola Outbreak in West Africa — Health Security in the European Union"	Council conclusions	3	24/5/2018	https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52015XG1217(02)&from=EN
78	2015	Expert Opinion on the Public Health Needs of Irregular Migrants, Refugees or Asylum Seekers across the EU's Southern and South-Eastern Borders	Scientific advice	20	24/5/2018	https://ecdc.europa.eu/sites/portal/files/media/en/publications/Publications/Expert-opinion-irregular-migrants-public-health-needs-Sept-2015.pdf

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79	2015	From Emergency to Recovery: EU Mobilises Efforts to End Ebola and Alleviate its Impact	Press release	2	24/5/2018	http://europa.eu/rapid/press-release_IP-15-4521_en.htm
80	2015	ISIL/Da'esh and 'Non-conventional' Weapons	Briefing	10	24/5/2018	http://www.europarl.europa.eu/RegData/etudes/BRIE/2015/572806/EPRS_BRI(2015)572806_EN.pdf
81	2015	Is There a Risk of Ebola Spreading in Europe? (long version)	Video	2:44	24/5/2018	http://ec.europa.eu/health/preparedness_response/videos/videos/ebola_2015_long_en.mp4
82	2015	Joint Procurement Workshop	Work-shop materials	31	24/5/2018	http://ec.europa.eu/health/preparedness_response/docs/ev_20150429_co22_en.pdf
83	2015	Joint Procurement Workshop's introductory speech	Speech	2	24/5/2018	http://ec.europa.eu/health/preparedness_response/docs/ev_20150429_intro_en.pdf
84	2015	Joint Procurement Workshop's keynote speech	Speech	3	24/5/2018	http://ec.europa.eu/health/preparedness_response/docs/ev_20150429_keynote_en.pdf
85	2015	Outbreak of Ebola Virus Disease in West Africa: 13th Update, 13 October 2015	Rapid risk assess-ment	9	24/5/2018	https://ecdc.europa.eu/sites/portal/files/media/en/publications/Publications/Ebola-west-africa-13th-update.pdf
86	2015	Report on the Implementation of Decision No 1082/2013/EU of the European Parliament and of the Council of 22 October 2013 on Serious Cross-Border Threats to Health and Repealing Decision No 2119/98/EC	Report	11	24/5/2018	http://ec.europa.eu/health/preparedness_response/docs/report_decision_serious_crossborder_threats_22102013_en.pdf

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87	2015	Severe Respiratory Disease Associated with Middle East Respiratory Syndrome Coronavirus (MERS-CoV): 21st Update, 21 October 2015	Rapid risk assess-ment	16	24/5/2018	https://ecdc.europa.eu/sites/portal/files/media/en/publications/Publications/MERS-rapid-risk-assessment-update-october-2015.pdf
88	2016	Crisis Management for Health Threats in the EU	Video	5:13	24/5/2018	http://ec.europa.eu/avservices/video/player.cfm?ref=I115268
89	2016	Preparedness - Simulation Exercises - Website	Web page	1	27/4/2016	http://ecdc.europa.eu/en/activities/response/Pages/PreparednessandResponse_Preparedness.aspx

- Finland

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90	1986	Tartuntatautilaki No. 583/1986 [Communicable Diseases Act] (Unofficial translation)	Act of law	20	24/5/2018	http://www.finlex.fi/en/laki/kaannokset/1986/en19860583.pdf
91	2001	Infectious Diseases in Finland 2000	Report	27	24/5/2018	http://www.julkari.fi/bitstream/handle/10024/78571/2001b10-tartuntataudit-2000eng.pdf?sequence=1
92	2002	Infectious Diseases in Finland 2001	Report	44	24/5/2018	http://www.julkari.fi/bitstream/handle/10024/78127/b9.pdf?sequence=1
93	2003	Infectious Diseases in Finland 2002	Report	42	24/5/2018	http://www.julkari.fi/bitstream/handle/10024/78574/2003b10.pdf?sequence=1
94	2003	Preparedness Unit	Brochure	12	25/4/2016	https://www.julkari.fi/bitstream/handle/10024/114693/Es200307eng.pdf?sequence=1
95	2003	Social Welfare and Health Care Preparedness in Case of Exceptional Situations	Brochure	16	25/4/2016	https://www.julkari.fi/bitstream/handle/10024/114686/Es200303eng.pdf?sequence=1

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96	2003	Valmiuslaki 1080/1991 [Emergency Powers Act] (unofficial translation)	Act of law	14	24/5/2018	http://www.finlex.fi/fi/laki/kaannokset/1991/en19911080.pdf
97	2004	Infectious Diseases in Finland 2003	Report	41	24/5/2018	http://www.julkari.fi/bitstream/handle/10024/78575/2004b9.pdf?sequence=1
98	2005	Infectious Diseases in Finland 1995–2004	Report	78	24/5/2018	http://www.julkari.fi/bitstream/handle/10024/78567/2005b13.pdf?sequence=1
99	2006	Infectious Diseases in Finland 2005	Report	61	24/5/2018	http://www.julkari.fi/bitstream/handle/10024/103002/2006b17.pdf?sequence=1
100	2006	Social Welfare and Health Care Preparedness in Case of Exceptional Situations in Finland	Brochure	32	24/5/2018	http://julkaisut.valtioneuvosto.fi/bitstream/handle/10024/70232/Es200605eng.pdf?sequence=1
101	2007	Infectious Diseases in Finland 2007	Report	44	24/5/2018	http://www.julkari.fi/bitstream/handle/10024/78129/2008b09.pdf?sequence=1
102	2008	Infectious Diseases in Finland 2008	Report	44	24/5/2018	http://www.julkari.fi/bitstream/handle/10024/79984/ee63107e-73f1-4d63-b988-0563e176e995.pdf?sequence=1
103	2008	Preparedness Unit	Brochure	12	25/4/2016	https://www.julkari.fi/bitstream/handle/10024/111496/URN%3aNBN%3afi-fe201504223246.pdf?sequence=1
104	2010	Infectious Diseases in Finland 1995–2009	Report	86	24/5/2018	http://www.julkari.fi/bitstream/handle/10024/79983/d6d63c66-9690-4f4d-9ee1-319bb5648eaf.pdf?sequence=1

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105	2010	Security Strategy for Society	Government resolution	102	24/5/2018	http://www.defmin.fi/files/1883/PDF.SecurityStrategy.pdf
106	2011	Infectious Diseases in Finland 2010	Report	64	24/5/2018	http://www.julkari.fi/bitstream/handle/10024/79985/c22be7c1-5e9a-4b2d-a7f8-7be4c530ffe5.pdf?sequence=1
107	2011	Preparedness and Comprehensive Security	Report	96	24/5/2018	http://vm.fi/documents/10616/622966/J1811_Preparedness+and+comprehensive+security.pdf/2a2e1f2c-a2d6-4577-bf5c-d366a74a2572?version=1.0
108	2011	Valmiuslaki 1552/2011 [Emergency Powers Act] (in Finnish)	Law	32	24/5/2018	https://www.edilex.fi/saadoskokoelma/20111552.pdf
109	2012	Infectious Diseases in Finland 2011	Report	65	24/5/2018	http://www.julkari.fi/bitstream/handle/10024/90816/URN_ISBN_978-952-245-662-5.pdf?sequence=1
110	2012	Infectious Diseases in Finland 2012	Report	73	24/5/2018	http://www.julkari.fi/bitstream/handle/10024/110696/URN_ISBN_978-952-245-894-0.pdf?sequence=1
111	2012	Zoonoses in Finland in 2000-2010	Report	88	24/5/2018	https://www.evira.fi/globalassets/elaimet/zoonoosikeskus/zoonoosit/zoonosesinfinland_final_nettiversio.pdf
112	2013	Finnish Security and Defence Policy 2012	Policy	121	24/5/2018	https://www.bbn.gov.pl/ftp/dok/07/FIN_Finnish_Security_Defence_Policy_2012_Government_Report.pdf

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113	2013	Pandemiarokotteen ja narkolepsian yhteys aikuisilla [Pandemic Vaccine and Narcolepsy Connections in Adults] (in Finnish)	Working paper	21	24/5/2018	https://www.julkari.fi/bitstream/handle/10024/104482/URN_ISBN_978-952-245-921-3.pdf?sequence=1
114	2013	Sikainfluenssa - influenssa A(H1N1) - Terveyden ja hyvinvoinnin laitoksen ohjeistus alkaen vuodesta 2009 [National Institute for Health and Welfare guidance from 2009] (in Finnish)	Guidance	46	24/5/2018	https://www.julkari.fi/bitstream/handle/10024/110358/URN_ISBN_978-952-245-970-1.pdf?sequence=1
115	2014	Infectious Diseases in Finland 2013	Report	68	24/5/2018	http://www.julkari.fi/bitstream/handle/10024/125566/URN_ISBN_978-952-302-194-5.pdf?sequence=1
116	2015	Tartuntataudit Suomessa 2014 [Infectious Diseases in Finland 2014] (in Finnish)	Report	70	24/5/2018	http://www.julkari.fi/bitstream/handle/10024/126263/URN_ISBN_978-952-302-481-6.pdf?sequence=1

- Spain

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117	1996	Protocolos de las enfermedades de declaración obligatoria [Protocols for Notifiable Diseases] (in Spanish)	Protocol	303	25/4/2016	http://ocw.unican.es/ciencias-de-la-salud/atencion-a-la-salud-de-la-comunidad/materiales/Tema%2015.pdf

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118	1997	Real Decreto 664/1997 sobre la protección de los trabajadores contra los riesgos relacionados con la exposición a agentes biológicos durante el trabajo [Royal Decree about the protection of workers against risks related to the exposure to biological agents during working hours] (in Spanish)	Decree	12	24/5/2018	https://www.boe.es/boe/dias/1997/05/24/pdfs/A16100-16111.pdf
119	2002	Protocolo de actuación ante una emisión deliberada de esporas de Bacillus anthracis [Response protocol in front of a deliberate release of Bacillus anthracis spores] (in Spanish)	Protocol	13	24/5/2018	http://www.isciii.es/ISCIII/es/contenidos/fd-servicios-cientifico-tecnicos/fd-vigilancias-alertas/protocolo-actuacion.pdf
120	2003	Ley 9/2003, por la que se establece el régimen jurídico de la utilización confinada, liberación voluntaria y comercialización de organismos modificados genéticamente [Law to establish the legal framework for the confined use, deliberated reléase and commercialisation of genetically modified organisms] (in Spanish)	Law	10	24/5/2018	https://www.boe.es/boe/dias/2003/04/26/pdfs/A16214-16223.pdf
121	2006	Actualización del plan nacional de preparación y respuesta ante una pandemia de gripe [Update of the national influenza pandemic preparedness and response plan] (in Spanish)	Protocol	59	24/5/2018	http://www.msssi.gob.es/ciudadanos/enfLesiones/enfTransmisibles/docs/ActualizacionPlan_diciembre2006.pdf

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122	2006	Valencia - Protocolo de Actuación frente a Enfermedades de Transmisión Aérea Peligrosas (PAETAP) [Response protocol in front of dangerous airborne transmission diseases] (in Spanish)	Protocol	34	2/5/2016	http://www.coma.es/ficheros/PAETAP%20ANEXOS%20Vers14022006.pdf
123	2008	Evaluación de las Redes Centinelas Sanitarias Integradas en El Sistema de Vigilancia de Gripe en España [Evaluation of health sentinel networks integrated in the surveillance system of influenza in Spain] (in Spanish)	Evaluation	153	24/5/2018	http://www.isciii.es/ISCIII/es/contenidos/fd-servicios-cientifico-tecnicos/fd-vigilancias-alertas/fd-enfermedades/EvaluacionredescentinelaSVGE.pdf
124	2008	Illes Balears - Protocolo de actuación ante accidente con material biológico [Response protocol in front of an accident involving biological material] (in Spanish)	Protocol	24	24/5/2018	http://www.ciutat.com/portal/protocolos/AB_07.pdf
125	2008	Plan de actuación en Cataluña ante una posible pandemia de gripe [Response protocol in Catalonia in front of a posible influenza pandemic] (in Spanish)	Plan	64	28/4/2016	http://www.gencat.es:8000/salut/depsalut/pdf/esgripavplemerg.pdf

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126	2011	Consolidación de un sistema de vigilancia nacional basado en centros centinelas. Indicadores sanitarios de las enfermedades infecciosas importadas por viajeros e inmigrantes [Consolidation of a system of national surveillance in sentinel centres. Health indicators of infectious diseases imported by travelers and immigrants] (in Spanish)	Report	92	24/5/2018	http://www.msssi.gob.es/profesionales/saludPublica/prevPromocion/promocion/migracion/docs/Consolidacion_centros_centinela.pdf
127	2011	Real Decreto 1097/2011 por el que se aprueba el Protocolo de Intervención de la Unidad Militar de Emergencias (UME) [Royal decree whereby the protocol of the Military Unit of Emergencies is approved] (in Spanish)	Decree	6	24/5/2018	https://www.boe.es/boe/dias/2011/07/26/pdfs/BOE-A-2011-12869.pdf
128	2012	Pla d'actuació a Catalunya enfront d'una infecció per virus de la grip en fase post-pandèmica [Response plan in Catalonia in front of an influenza virus infection in the post-pandemic phase] (in Catalan)	Plan	17	28/4/2016	http://grip.gencat.cat/web/.content/home_canal_salut/professionals/temes_de_salut/grip/documents/grippostpan2010.pdf
129	2013	Estrategia de Seguridad Nacional - Un Proyecto Compartido [National Security Strategy – A Shared Project] (in Spanish)	Strategy	68	24/5/2018	http://www.lamoncloa.gob.es/documents/seguridad_1406connavegacionfinalaccesiblebpdf.pdf
130	2013	Sistema de Alerta Precoz y Respuesta Rápida [Early alert and response system] (in Spanish)	Response system protocol	23	24/5/2018	http://www.msssi.gob.es/profesionales/saludPublica/ccayes/SIARP/Mssi_SIAPR_21032013.pdf

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131	2014	Procedimiento Actuación Frente a Casos Humanos de Infección por el Nuevo Virus de la Gripe Aviar (H7N9) [Response procedure in front of human cases of the new avian influenza virus (H7N9)] (in Spanish)	Procedure	12	24/5/2018	http://www.msssi.gob.es/profesionales/saludPublica/ccayes/alertasActual/docs/201402Procactua1gripe_H7N9.pdf
132	2014	Protocolo de Actuación ante una Aeroevacuación Médica ante Casos de Enfermedad por Virus del Ébola [Response protocol in front of a medical aeroevacuation in front of disease due to the Ebola virus] (in Spanish)	Protocol	9	24/5/2018	http://www.msssi.gob.es/profesionales/saludPublica/ccayes/alertasActual/ebola/docs/Protocolo_aeroevacuacion_05092014.pdf
133	2014	Recomanacions per al personal sanitari en contacte amb casos confirmats o sospitosos per la febre hemorràgica pel virus d'Ebola [Recommendations for healthcare workers in contact with confirmed or suspected cases of haemorrhagic fever because of the Ebola virus] (in Catalan)	Recommendations	14	24/5/2018	http://ca.codigi.cat/upload/apartat/ebolapersonalsanitari042014.pdf
134	2014	Recomendaciones para mejorar medidas de biocustodia [Recommendations for the improvement of biosecurity measures] (in Spanish)	Recommendations	33	24/5/2018	http://www.exteriores.gob.es/Portal/es/SalaDePrensa/Multimedia/Publicaciones/Documents/2014_biocustodia.pdf
135	2015	Catalunya - Pla d'informació de les infeccions respiratòries agudes a Catalunya (PIDIRAC) 2015–2016 [Information plan for acute respiratory infection in Catalonia] (in Catalan)	Strategy	11	28/4/2016	http://grip.gencat.cat/web/.content/home_canal_salut/professionals/recursos/protocols_i_recomanacions/06_grip/documents/arxius/estrategia.pdf

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136	2015	Catalunya - Procediment d'Actuació davant Casos Sospitosos de Febre Hemorràgica pel Virus d'Ebola (FHVE) [Response procedure in front of suspected cases of haemorrhagic fever because of the Ebola virus] (in Catalan)	Procedure	26	24/5/2018	http://canalsalut.gencat.cat/web/.content/home_canal_salut/professionals/temes_de_salut/ebola/documents/procediment_casos_ebola04_2014.pdf
137	2015	Consells per al viatgers que arriben o surten Guinea, Sierra Leone o algun país amb transmissió activa de casos FHVE [Advice for travelers arriving or leaving Guinea, Sierra Leone or some country with an active transmission of haemorrhagic fever because of the Ebola virus] (in Catalan)	Advice	3	24/5/2018	http://canalsalut.gencat.cat/web/.content/home_canal_salut/professionals/temes_de_salut/ebola/documents/consells_ebola.pdf
138	2015	Procedimiento actuación frente a Casos de Infección por el Nuevo Coronavirus (MERS-CoV) [Response procedure in front of infection cases because of the new coronavirus (MERS-CoV)] (in Spanish)	Procedure	16	24/5/2018	https://www.msssi.gob.es/profesionales/saludPublica/ccayes/alertasActual/docs/ProcedimientoBIS-MERS-CoV_10_03_2015.pdf
139	2015	Protocolo de Actuación frenta a Casos Sospechoso de Enfermedad por Virus Ébola [Response protocol in front of suspected cases of disease because of Ebola virus] (in Spanish)	Protocol	51	24/5/2018	https://www.msssi.gob.es/profesionales/saludPublica/ccayes/alertasActual/ebola/documentos/16.06.2015-Protocolo_Ebola.pdf

- United Kingdom

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140	2001	Anti-terrorism, Crime and Security Act	Act of law	8	24/5/2018	http://www.legislation.gov.uk/ukpga/2001/24/pdfs/ukpga_20010024_en.pdf
141	2004	Civil Contingencies Act	Act of law	36	24/5/2018	http://www.legislation.gov.uk/ukpga/2004/36/pdfs/ukpga_20040036_en.pdf
142	2008	Preparing for Pandemic Influenza – Supplementary Guidance for Local Resilience Forum Planners	Guidance	56	24/5/2018	https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/62086/flu_lrf_best__20practice_final.pdf
143	2010	Initial Investigation and Management of Outbreaks and Incidents of Unusual Illnesses	Guide	68	24/5/2018	http://webarchive.nationalarchives.gov.uk/20140714084352/http://www.hpa.org.uk/webc/HPAwebFile/HPAweb_C/1201265888951
144	2011	Introductory Advice to Staff on Planning for Pandemic Influenza	Advice	6	24/5/2018	https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/61336/intro_staffadvice_flu_planning.pdf
145	2011	Pandemic Influenza Checklist for Businesses	Checklist	4	24/5/2018	https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/61986/060516flubcpchecklist.pdf
146	2011	UK Influenza Pandemic Preparedness Strategy 2011	Strategy	70	24/5/2018	https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/213717/dh_131040.pdf

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147	2013	Infection Control Advice: Middle East Respiratory Syndrome Coronavirus (MERS-CoV)	Advice	9	2/5/2016	https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/361569/MERS-CoV_infection_control.pdf
148	2013	Preparing for Pandemic Influenza: Guidance for Local Planners	Guidance	37	24/5/2018	https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/225869/Pandemic_Influenza_LRF_Guidance.pdf
149	2014	Ebola Infection Prevention and Control Guidance for Emergency Departments	Guidance	4	24/5/2018	https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/377220/Ebola_infection_prevention_and_control_guidance_for_emergency_departments.pdf
150	2014	Ebola Infection Prevention and Control Guidance for Primary Care	Guidance	3	24/5/2018	https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/377223/Ebola_infection_prevention_and_control_guidance_for_primary_care.pdf
151	2014	MERS-CoV Close Contact Algorithm	Algorithm	1	24/5/2018	https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/422713/Algorithm_contact_v16.pdf
152	2014	Pandemic Influenza Response Plan	Response plan	88	24/5/2018	https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/344695/PI_Response_Plan_13_Aug.pdf
153	2014	Pandemic Influenza Strategic Framework	Strategic frame-work	19	24/5/2018	https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/344696/PI_Strategic_Framework_13_Aug.pdf

No.	Year	Name	Type	Page	Last access	Source
154	2015	Ebola: Information for the Funeral Industry, Coroners' Offices and Pathology Departments	Guidance	14	24/5/2018	https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/404086/Ebola_Information_for_the_Funeral_Industry_v2.pdf
155	2015	Global Health Security Agenda Pilot Assessment of the United Kingdom	Report	88	24/5/2018	https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/456984/IndependentReport_GHS_acc.pdf
156	2015	Global Health Strategy 2014 to 2019	Strategy	26	24/5/2018	https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/354156/Global_Health_Strategy_final_version_for_publication_12_09_14.pdf
157	2015	National Risk Register of Civil Emergencies	Register	54	2/5/2016	https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/419549/20150331_2015-NRR-WA_Final.pdf
158	2015	Public health Recommendations for Asymptomatic Contacts of an Ebola Case in the UK	Recommendations	3	24/5/2018	https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/402483/Public_health_recommendations_for_asymptomatic_contacts_of_an_Ebola_case.pdf
159	2015	'The First Few Hundred (FF100)': Enhanced Case and Contact Protocol v6.3	Protocol	45	24/5/2018	https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/484195/2015_2016_FF100_Protocol_MERSCoV_V6_3_20155527.pdf

No.	Year	Name	Type	Page	Last access	Source
160	2015	Treatment of MERS-CoV: Information for Clinicians – Clinical Decision-making Support for Treatment of MERS-CoV Patients	Decision-making support	33	2/5/2016	https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/459835/merscov_for_clinicians_sept2015.pdf
161	2015	UK International Chemical, Biological, Radiological and Nuclear Security Assistance Programmes	Report	16	24/5/2018	https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/472421/20151030_UC_CBRN_Security_Report.pdf

- Biological Weapons Convention

No.	Year	Name	Type	Page	Last access	Source
162	1975	Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on Their Destruction	Convention	5	24/5/2018	https://www.unog.ch/80256EDD006B8954/(httpAssets)/C4048678A93B6934C1257188004848D0/$file/BWC-text-English.pdf
163	2012	Biological Weapons Convention: Background Information	Background information document	7	27/4/2016	http://www.unog.ch/80256EDD006B8954/(httpAssets)/CF1D6A8403271778C1257AAF0055BB6C/$file/BWC-Background_Inf_Nov%202012.pdf
164	2015	-	Workshop report	4	-	Confidential
165	2015	Chairman's letter to States Parties, 19 Oct. 2015	Letter	4	24/5/2018	http://www.unog.ch/80256EDD006B8954/(httpAssets)/335172F73C8B9A29C1257EE400528BDF/$file/Chairman+letter+to+States+Parties+-+19+Oct.+2015.pdf
166	2015	-	Statement	2	-	Confidential

No.	Year	Name	Type	Page	Last access	Source
167	2015	Report on Implementation of Article X of the Biological and Toxin Weapons Convention	Implementation report	7	24/5/2018	http://www.unog.ch/80256EDD006B8954/(httpAssets)/4A5A6A7142EB9857C1257F060039A7B8/$file/2015+UK's+INF+paper+on+Article+X.pdf
168	2015	Synthesis of Considerations, Lessons, Perspectives, Recommendations, Conclusions and Proposals Drawn from the Presentations, Statements, Working Papers and Interventions on the Topics under Discussion at the Meeting of Experts	Synthesis paper	14	27/4/2016	http://www.unog.ch/80256EDD006B8954/(httpAssets)/73D1D1B7F64E42B4C1257EF900367088/$file/2015+MSP+Synthesis+Paper+-+English.pdf

- WHO country office in Egypt and Regional Office for the Eastern Mediterranean (EMRO)

No.	Year	Name	Type	Page	Last access	Source
169	2005	3 Top Priorities for States Parties to Implement the IHR	Informational document	3	24/5/2018	http://www.who.int/ihr/three_priorities.pdf
170	2007	Seven Strategic Actions to Guide IHR (2005) Implementation	Guidance	1	24/5/2018	http://www.who.int/whr/2007/media_centre/07_chap5_fig02_en.pdf
171	2008	International Health Regulations: Guidance for National Policy-makers and Partners	Guidance	8	24/5/2018	http://www.who.int/ihr/lyon/WHO_CDS_EPR_IHR_2007_2EN.pdf
172	2009	Avian Influenza	Video	1:36	24/5/2018	http://applications.emro.who.int/docs/media/Avian_influenza_2009_en.mpg
173	2009	Join Us in Fighting Bird Flu	Leaflet	1	24/5/2018	http://applications.emro.who.int/dsaf/emrpub_2009_en_1795.pdf?ua=1

No.	Year	Name	Type	Page	Last access	Source
174	2011	Communicable Diseases in the Eastern Mediterranean Region: Prevention and Control 2005–2009	Report	8	24/5/2018	https://extranet.who.int/iris/restricted/bitstream/10665/116691/1/dsa1226.pdf
175	2011	Arab Republic of Egypt (Influenza Division International Activities materials)	Report	3	24/5/2018	http://www.cdc.gov/flu/pdf/international/program/2011-12/egypt.pdf
176	2011	-	Review	60	-	Confidential
177	2012	-	Action plan	25	-	Confidential
178	2013	Consultative Meeting to Determine a Public Health Research Agenda on MERS-CoV	Report	13	24/5/2018	http://applications.emro.who.int/docs/IC_Meet_Rep_2014_EN_15224.pdf
179	2013	Arab Republic of Egypt (Influenza Division International Activities, annual report for fiscal years 2012 and 2013)	Report	2	24/5/2018	http://www.cdc.gov/flu/pdf/international/program/2013/egypt.pdf
180	2013	International Health Regulations (2005): Criteria for Additional Extensions	Agenda item	4	24/5/2018	http://applications.emro.who.int/docs/RC_Techn_paper_2013_8_15037_EN.pdf
181	2013	Meeting on Influenza at the Human–Animal Interface	Report	13	24/5/2018	http://applications.emro.who.int/docs/IC_Meet_Rep_2013_EN_14927.pdf
182	2013	Progress Report on Implementing the International Health Regulations (2005)	Report	3	24/5/2018	http://applications.emro.who.int/docs/RC_Techn_paper_2013_inf_doc_5_14986_EN.pdf?ua=1
183	2014	Communicable Diseases in the Eastern Mediterranean Region: Prevention and Control 2012–2013	Report	23	24/5/2018	http://applications.emro.who.int/dsaf/EMRPUB_2014_EN_1756.pdf
184	2015	Fourth Seminar on Health Diplomacy	Report	4	24/5/2018	http://applications.emro.who.int/docs/IC_Meet_Rep_2015_EN_16400.pdf?ua=1

No.	Year	Name	Type	Page	Last access	Source
185	2016	Implementation of the Pandemic Influenza Preparedness Framework in the WHO Eastern Mediterranean Region	Web page	7	27/6/2016	http://www.emro.who.int/fr/surveillance-prevision-et-action/pandemic-influenza/regionalframework.html
186	2016	Pandemic Influenza Preparedness Framework	Web page	2	27/6/2016	http://www.emro.who.int/surveillance-forecasting-response/pandemic-influenza/index.html

- Interviews

To preserve the privacy of my informants, I refer only to their area of expertise and their country or, if more relevant, their transnational organisation. For confidentiality reasons, I do not make reference to the specific unit or institution where they were carrying out their work.

Interviewee	Area of expertise	Country/organisation	Date	Interview length
WHO_01	Preparedness	WHO	20/1/2016	0:35:48
WHO_02	IHR implementation	WHO	26/1/2016	0:37:15
WHO_03	Epidemiology	WHO	26/1/2016	0:52:11
WHO_04	Health systems	WHO	1/2/2016	0:29:51
WHO_05	Public-health emergencies	WHO	2/2/2016	0:50:35
WHO_06	IHR implementation	WHO	7/2/2016	No Recording
EU_01	Health threats	EU	19/3/2014	1:06:37
EU_02	Counterterrorism	EU	14/2/2014	0:53:07
EU_03	Preparedness	EU	4/11/2015	1:13:52
FI_01	Biosecurity and biosafety	Finland	9/6/2015	0:53:04
FI_02	Communicable diseases and vaccinations	Finland	17/9/2015	1:00:19
FI_03	Animal health	Finland	29/7/2016	0:38:08
SP_01	Health emergencies	Spain	7/7/2015	0:49:46
SP_02	Military biosecurity	Spain	9/12/2015	0:40:54
SP_03	Biosecurity and biosafety	Spain	6/3/2014	1:06:11
UK_01	Global health	UK	17/11/2015	0:50:25
UK_02	Emergency planning	UK	23/12/2015	0:34:20
UK_03	The Biological Weapons Convention	UK	17/3/2016	0:35:37

- Ethnographic diaries

Year	Name	Site	Timeframe
2015	BWC Diaries	BWC states parties meeting, Geneva	14/12/2015–16/12/2015
2016	Cairo WHO Diaries	WHO Egypt Country Office	10/1/2016–19/2/2016

ANNEX 2: CLARIFICATION OF ATLAS.TI NOMENCLATURE

The following nomenclature is applied with regard to ATLAS.ti.

Primary documents (also **PDs** or **PDocs**): Primary documents represent the data added to an ATLAS.ti project. These may be textual, image, audio, video, or geographic materials.

Primary-document families (used especially as data attributes): A family in ATLAS.ti is a group of objects (see the entry 'Families', below). Primary-document families fulfil a special function, as they can be regarded as quasi-dichotomous variables. The PD families can be later used to restrict code-based searches, and they can be used for filtering also – for example, one can filter by PD family to reduce the volume of certain types of output, as with a frequency count for codes across a particular group of documents.

Quotations: A quotation is a segment from a PD that is interesting or important to the user. In textual documents, a quotation can be an arbitrary sequence of characters ranging in length from a single character to a word, sentence, or paragraph, even potentially encompassing the entire data file. Free quotations resemble passages 'scribbled' in the margin of a book.

Codes: Codes are used as classification devices at multiple levels of abstraction, for creation of sets of related information units for the purpose of comparison (a code might represent, for example a concept – e.g., 'Coping Strategy').

Families: Families are a way to form clusters of PDs, codes, and memos for easier handling of groups of these. Primary-document families can be regarded as attributes or variables.

Memos: Memos capture your thoughts regarding the text and are an important device for creating theory.

All definitions above are paraphrased from *ATLAS.ti 7 User Guide and Reference*, available at:
https://atlasti.com/wp-content/uploads/2014/05/atlasti_v7_manual_201312.pdf?q=/uploads/media/atlasti_v7_manual_201312.pdf

ANNEX 3: LIST OF ATLAS.TI CODES

Alongside the ATLAS.ti codes used, this list indicates the number of quotations associated with each family code. For reasons of length, the full list of codes is not presented here; however, it can be accessed online at https://www.dropbox.com/s/ar8kyqdh45t8ylu/AllCodes.xlsx?dl=0.

Family code	WHO	EU	FI	SP	UK	EM-EG	BWC	SCI	Ebola	Infl.	MERS	TOTAL
Accessibility	16	23	1	3	9	0	4	2	1	5	0	64
Action	4	1	1	2	2	0	0	1	0	1	0	12
Administration	5	1	5	2	13	2	0	0	0	0	2	30
Affect	17	2	0	0	0	0	0	4	1	2	0	26
Agreement	56	32	17	5	12	4	13	10	9	6	0	164
Alert	30	11	0	5	1	0	0	1	4	12	1	65
Animal	39	20	10	14	6	3	1	28	4	3	10	138
Anticipation	18	6	2	2	9	1	0	8	1	0	1	48
Approach	28	22	3	5	7	3	0	0	0	4	0	72
Assessment	74	28	9	9	17	1	1	3	7	6	0	155
Attack	12	13	1	7	5	0	0	4	0	0	0	42
Authority	13	14	4	0	0	0	1	2	2	2	0	38
Awareness	6	19	4	2	6	2	1	2	0	0	3	45
Bioagent	79	52	2	17	8	0	1	12	1	1	0	173
Biomaterial	50	4	2	4	1	0	1	11	5	11	0	89
Biosecurity	28	20	8	11	11	1	3	9	0	0	0	91
Biosafety	45	20	10	17	12	0	6	16	3	1	1	131
Bioweapons	20	5	6	3	5	0	10	6	0	0	0	55
Background	14	3	2	1	4	1	0	8	1	2	0	36
Barrier	3	0	0	6	1	0	0	2	0	0	1	13
Behaviour	22	0	0	0	6	1	0	1	0	0	0	30
Borders	15	82	5	3	4	1	1	2	5	1	1	120
Boundaries	20	45	1	0	8	2	0	1	0	0	0	77
Capacity	17	13	1	1	1	0	5	1	2	1	0	42
Cases	33	6	0	13	7	0	0	4	12	2	0	77
Change	13	13	8	2	5	0	2	18	2	4	0	67
Civil society	2	0	9	0	3	0	10	1	1	0	0	26
Code of conduct	4	11	1	0	0	0	3	1	0	0	0	20
Collaboration	17	5	14	1	5	0	1	4	2	2	0	51
Communication	77	32	12	11	21	3	7	8	10	4	0	185
Community	26	2	0	2	2	0	0	3	9	2	0	46

Family code	WHO	EU	FI	SP	UK	EM-EG	BWC	SCI	Ebola	Infl.	MERS	TOTAL
Consequences	23	7	0	3	6	0	0	4	0	0	0	43
Contact	24	26	0	14	9	0	0	5	17	7	7	109
Control	45	6	2	15	2	0	0	1	3	0	1	75
Co-operation	16	34	7	1	5	0	9	3	1	4	0	80
Co-ordination	23	40	6	12	14	3	2	2	9	2	0	113
Corpses	5	0	0	3	11	0	0	1	0	0	0	20
Counter-measures	25	43	11	11	13	0	3	12	5	9	0	132
Country	30	45	7	1	3	0	2	3	2	2	1	96
Culture	12	10	3	2	0	0	1	4	5	0	0	37
Data	32	7	3	5	4	0	1	16	1	2	0	71
Dichotomy	140	37	37	11	28	2	10	38	11	14	5	333
Decision-making	11	6	1	0	4	1	1	2	1	2	0	29
Definition	28	14	2	1	3	0	0	0	0	0	0	48
Detection	17	43	6	2	8	0	2	5	2	0	3	88
Diagnosis	12	7	2	5	2	0	1	4	5	2	3	43
Difference	10	6	6	1	5	0	5	6	0	0	0	39
Disease	140	60	28	20	14	3	3	39	23	27	4	361
Dual-use	12	9	7	6	2	0	8	9	0	0	0	53
Economics	29	18	0	3	4	0	1	6	4	6	0	71
Education	0	10	5	2	2	0	2	0	0	0	0	21
Emergency	69	43	24	4	16	4	1	6	8	4	1	180
Environment	20	2	0	4	2	0	0	0	1	0	1	30
Epidemic	29	2	3	1	1	0	0	3	5	0	0	44
Epidemiology	9	3	0	0	1	0	0	0	0	0	0	13
Equipment	42	13	3	15	8	0	0	6	9	1	1	98
Ethics	19	1	0	0	1	0	0	4	7	0	0	32
Event	50	6	4	3	12	1	0	5	1	0	0	82
Exchange	0	8	1	2	1	0	5	1	0	0	0	18
Exercises	13	48	7	7	3	0	0	1	0	0	0	79
Expertise	26	21	15	0	5	0	4	6	7	2	1	87
First responders	8	6	0	0	4	0	0	0	0	0	0	18
Food	13	12	2	3	0	2	0	2	1	0	1	36
Funding	14	30	1	0	3	0	2	1	6	0	0	57
Genes	20	2	2	0	2	0	2	7	1	8	2	46
Guidance	18	21	3	6	6	0	1	3	5	3	2	68
Health	26	15	3	2	2	0	2	0	4	1	0	55

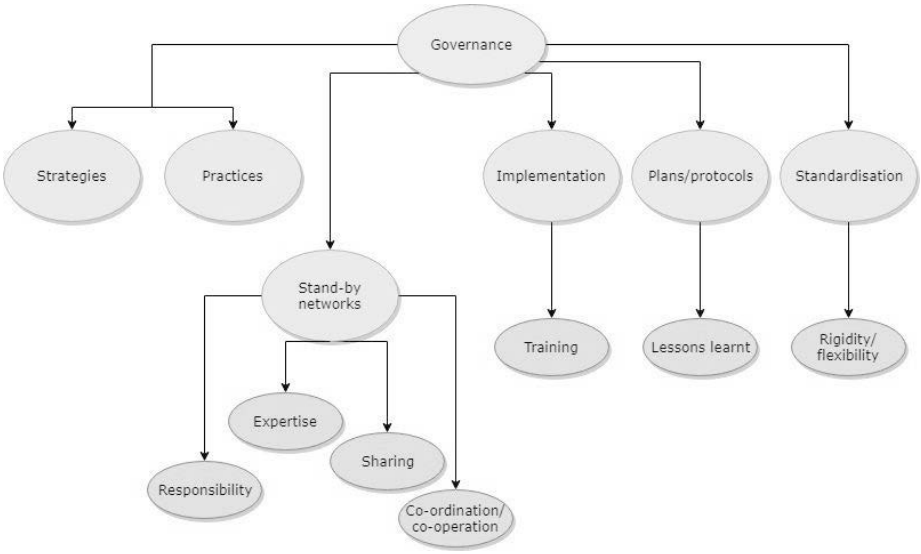
Family code	WHO	EU	FI	SP	UK	EM-EG	BWC	SCI	Ebola	Infl.	MERS	TOTAL
Health care	26	22	14	2	3	0	0	3	20	1	7	98
Hierarchy	17	17	4	2	2	0	1	1	0	1	0	45
Hospitals	12	10	6	5	0	0	0	2	6	3	4	48
Impact	7	3	1	8	15	1	1	1	0	2	0	39
Implementation	30	31	3	3	2	3	3	3	1	5	0	84
Infection	23	7	2	8	7	0	0	3	5	1	3	59
Information	50	38	16	12	21	1	4	17	4	3	0	166
Institutions	8	10	1	4	0	0	0	1	0	2	0	26
Intervention	24	0	3	1	2	1	0	0	3	3	0	37
Interdisciplinary	20	2	3	3	9	1	1	0	0	0	1	40
Isolation	46	5	11	5	6	0	0	15	3	0	7	98
Knowledge	32	13	6	6	8	2	6	9	2	3	0	87
Laboratory	54	39	17	10	5	0	1	7	11	4	2	150
Language	4	1	11	4	0	0	7	10	0	0	0	37
Law	14	37	13	4	3	0	4	1	0	1	0	77
Logics	21	8	0	0	3	0	2	1	3	1	7	46
Measures	42	36	10	20	6	0	1	2	19	4	3	143
Media	7	4	4	1	6	0	0	6	0	2	0	30
Military	2	9	7	5	4	0	0	3	1	0	0	31
Modelling	1	6	0	0	6	0	0	8	0	0	0	21
Monitoring	13	25	7	0	0	0	0	2	10	1	0	58
Network	17	17	4	8	1	0	0	9	2	0	0	58
Notification	13	1	23	20	1	0	0	1	1	0	2	62
Organisation	14	44	25	4	7	1	2	2	8	3	0	110
Outbreak	38	20	3	1	4	1	2	5	2	0	0	76
Pandemic	37	15	11	12	24	0	0	8	0	31	0	138
Patient	8	4	4	6	1	0	0	6	1	1	1	32
Pharmaceuticals	6	6	10	1	3	0	1	6	1	5	0	39
Plan	29	12	3	9	9	1	0	0	0	5	0	68
Policy	6	33	3	0	0	1	1	2	1	2	0	49
Politics	16	5	14	17	6	2	6	2	0	1	1	70
Population	27	7	7	9	0	1	0	5	2	0	0	58
Practices	48	32	4	5	10	1	2	10	15	1	0	128
Preparedness	62	58	34	7	10	4	1	4	10	7	1	198
Prevention	21	14	7	27	3	0	1	2	1	0	0	76
Private sector	6	51	12	0	18	2	0	0	4	1	0	94
Protection	17	8	3	9	2	0	0	2	0	0	1	42
Protocol	4	1	0	13	2	0	1	0	2	0	0	23
Public	13	24	4	3	2	0	0	6	3	2	0	57

Family code	WHO	EU	FI	SP	UK	EM-EG	BWC	SCI	Ebola	Infl.	MERS	TOTAL
Public health	38	8	1	2	0	0	0	3	0	2	0	54
Public sector	0	11	2	1	0	0	0	0	0	0	0	14
Register	2	42	8	7	1	0	0	1	0	1	0	62
Regulation	5	25	1	1	2	0	3	0	0	0	0	37
Release	12	5	2	5	6	0	5	2	0	1	0	38
Religion	11	1	2	0	0	0	1	0	8	0	1	24
Report	20	11	6	2	0	1	3	5	0	1	1	50
Research	13	20	8	5	11	0	2	21	2	2	0	84
Resources	11	10	5	4	2	0	2	3	3	0	0	40
Response	36	39	7	12	27	3	1	5	5	4	0	139
Risk	77	43	6	18	14	1	2	9	11	1	4	186
Responsibility	32	23	9	8	9	0	3	1	2	6	0	93
Safety	5	3	1	0	2	0	0	0	5	1	0	17
Samples	23	13	0	6	3	0	0	13	3	1	5	67
Scenario	3	15	3	2	2	0	0	1	1	0	0	27
Science	28	14	5	3	15	0	13	7	3	1	0	89
Security	3	18	23	5	1	0	0	0	0	0	0	50
Sharing	5	17	2	0	5	0	2	5	1	3	0	40
Source	21	2	0	0	0	0	0	10	0	0	0	33
Space	47	29	17	17	27	3	0	21	11	3	4	179
Spread	19	8	2	6	1	0	0	9	3	0	3	51
Staff	11	5	3	8	5	3	2	5	3	1	0	46
Stand-by	7	9	2	0	0	0	0	0	0	1	0	19
Statistics	29	2	0	2	4	0	0	6	1	2	0	46
Standards	20	41	0	2	1	0	0	5	2	0	0	71
Stockpiling	11	21	15	3	11	0	3	3	0	6	0	73
Strategy	7	7	1	3	6	1	0	1	2	1	0	29
Support	23	5	8	1	4	0	6	2	1	2	0	52
Surveillance	107	26	15	19	13	5	2	37	5	6	3	238
Symptoms	11	4	5	3	4	0	0	4	4	1	7	43
System	51	24	5	36	20	1	1	6	10	17	0	171
Technical	18	0	1	1	3	1	2	0	0	1	0	27
Technology	23	18	12	6	5	0	21	6	0	2	2	95
Temporality	36	15	11	5	6	0	1	9	7	4	1	95
Terrorism	2	50	1	4	5	0	1	7	0	0	0	70
Test	8	5	2	1	2	0	0	6	0	0	4	28

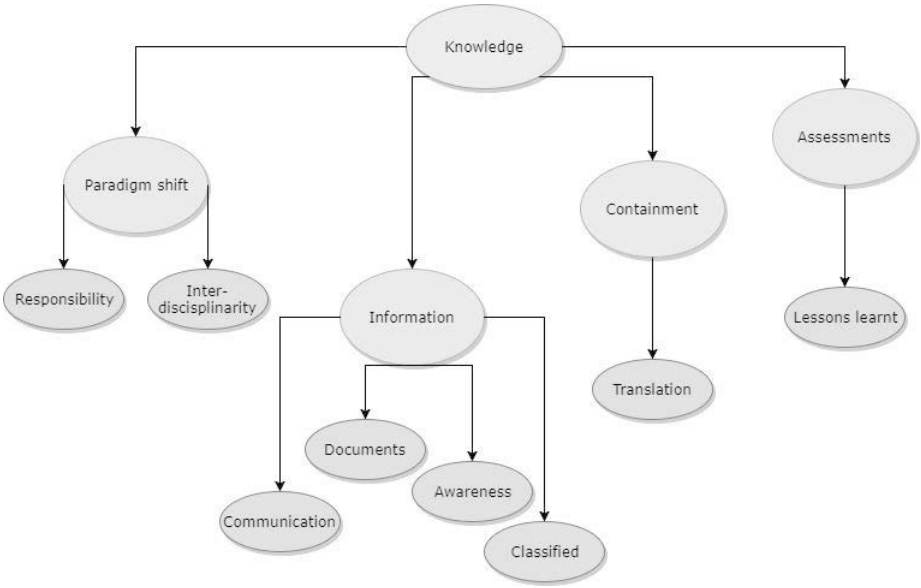
Family code	WHO	EU	FI	SP	UK	EM-EG	BWC	SCI	Ebola	Infl.	MERS	TOTAL
Threat	42	71	26	9	7	1	4	2	0	1	0	163
Training	36	25	12	8	9	4	3	4	2	1	0	104
Transmission	45	13	5	19	1	0	0	11	14	0	11	119
Transport	32	47	5	27	10	0	0	16	22	6	10	175
Treatment	21	15	5	2	6	0	0	6	14	1	1	71
Trials	0	3	0	0	1	0	1	9	1	0	0	15
Uncertainty	13	4	0	2	7	0	0	1	1	3	0	31
Understanding	9	1	2	0	3	0	2	3	2	0	0	22
Vaccination	50	49	24	8	11	0	3	28	9	35	1	218
Value	9	3	0	0	0	0	1	3	0	0	0	16
Vector	14	3	2	1	0	0	0	2	1	0	0	23
Virtual/actual	7	13	1	3	1	0	1	0	2	2	0	30
Virus	33	11	8	5	4	0	1	18	5	24	3	112
Vulnerability	10	4	2	2	0	0	0	2	2	0	2	24
Worst-case	0	1	0	0	9	0	0	3	0	0	0	13
TOTAL	**4,219**	**3,011**	**1,016**	**998**	**1,009**	**94**	**316**	**945**	**642**	**472**	**186**	**12,908**

ANNEX 4: CODE MAPS

- Governance:



- Knowledge:



- Conceptualisation of threat: