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EPIDEMIC DISEASES: BETWEEN COOPERATION AND COMPETITION

THE EVOLUTION OF THE INTERNATIONAL SANITARY COOPERATION AND NEW CHALLENGES

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ABSTRACT

Le malattie epidemiche sono da sempre state una delle maggiori minacce che l'uomo ha dovuto affrontare nel corso della sua storia. Ed è proprio l'uomo che, paradossalmente, ha alimentato tale minaccia con lo sviluppo della società stessa: urbanizzazione, crescita demografica, commercio, viaggi, colonizzazione, conflitti. Le malattie epidemiche non si fermano ai confini nazionali, ed è proprio la loro natura transfrontaliera a richiedere una risposta a livello internazionale. Questa tesi è iniziata con la necessità di trattare un quesito specifico: determinare se la cooperazione sanitaria internazionale è stata migliorata o perfezionata nel corso del tempo. La risposta affermativa a tale quesito ha suscitato l'interesse di capire quale siano state le origini che ha spinto l'umanità a cercare una risposta congiunta ad una sfida comune: il contrasto, in ogni sua forma, alle malattie epidemiche. L'elaborato si pone quindi come obbiettivo l'analisi delle origini e l'evoluzione della cooperazione sanitaria internazionale come risposta alla lotta contro le malattie infettive a carattere epidemico.

Una risposta globale contro le malattie epidemiche comporta diverse difficoltà. Tra le sfide più rilevanti è possibile indicare la necessità di stabilire un certo grado di collaborazione tra stati e organizzazioni non governative, la capacità di assicurare continui fondi e finanziamenti economici, stimolare una profonda partecipazione da parte della popolazione e la difficoltà da parte delle autorità sanitarie nel cercare di prevenire e/o contrastare le malattie infettive trovandosi spesso in condizioni di incertezza. Questo studio dimostra che l'umanità ha sempre cercato un modo per cooperare nella lotta comune e globale contro le malattie epidemiche. Spesso però, ha anche cercato di usarle e sfruttarle per far avanzare determinati interessi, danneggiando altre comunità considerate rivali in ambito economico e/o politico. L'elaborato dimostra come la cooperazione sanitaria non è definibile come un semplice processo lineare e costante, ma bensì un percorso lungo e notevolmente travagliato. Ad oggi, la cooperazione internazionale ha raggiunto livelli senza precedenti, ma non senza limiti e profonde debolezze.

È stato individuato il periodo moderno come punto di partenza di questa analisi. È infatti durante tale periodo che è nata l'idea che un approccio congiunto, in particolar modo a livello internazionale, possa risultare più efficace nel far fronte alla minaccia posta dalla diffusione delle malattie epidemiche, che proprio in quel periodo è aumentata esponenzialmente su scala globale. Per contrastare questa minaccia, numerosi paesi, in special modo la Repubblica di Venezia, si sono impegnati ad adottare specifiche politiche sanitarie per rispondere alla necessità di trovare un compromesso tra la salute ed i profitti derivati dal commercio internazionale. La contezza che la diffusione di alcune malattie era inestricabilmente connessa agli spostamenti degli individui e delle

merci ha portato ad una maggiore consapevolezza della necessità di implementare una risposta internazionale.

Questa tesi si serve di una vasta ricerca di testi letterari, medici e diplomatici del periodo moderno e contemporaneo. Le principali domande di ricerca sono: (I) quali sono state le origini della cooperazione internazionale contro le malattie epidemiche, (II) come questo processo si è sviluppato ed evoluto nel corso del tempo, (III) quali sono stati i risultati ottenuti grazie al dibattito internazionale, (IV) quali sono state le malattie che maggiormente hanno contribuito ad innescare politiche di cooperazione sanitaria internazionale. I risultati ottenuti possono essere utili per studi futuri che indagano sulla continua evoluzione della cooperazione sanitaria e sulla capacità da parte della comunità internazionale ad affrontare nuove e diverse sfide. Inoltre, le intuizioni di questa ricerca potrebbero permettere di indagare sulle opportunità, permesse da un sistema internazionale più maturo e preparato rispetto al passato, nell'instaurare una più efficace cooperazione sanitaria.

Il metodo principale utilizzato per la stesura di questo elaborato consiste nella revisione di documenti pubblicati nel corso di oltre duecento anni, comprendenti testi multidisciplinari riguardanti ricerca medica e storia sociale, rapporti e trascrizioni di conferenze sanitarie internazionali e/o da organi politici, articoli e ricerche scientifiche. Per raggiungere lo scopo prefissato, questa tesi introduce elementi di storia intellettuale, religiosa e scientifica, e analizza inoltre come differenti popolazioni e stati abbiano interagito tra loro per contrastare la minaccia comune provocata dalle malattie epidemiche.

Il capitolo uno presenta alcuni approfondimenti di base e concetti essenziali. Vengono quindi definiti i termini chiave, fornendo la necessaria distinzione tra i concetti di focolaio, epidemia, pandemia ed endemia. Fino al XIX secolo questi concetti non avevano una definizione comune, e spesso venivano usati intercambiabilmente senza una distinzione precisa, riflettendo la mancanza di conoscenza medico/scientifica. A tal riguardo, questo studio dimostra come la mancanza di una terminologia comune e concetti uniformi abbia significativamente limitato la cooperazione sanitaria. Seguono le definizioni di pratiche mediche sviluppate nel tempo: l'inoculazione, messa in atto in periodi e modi diversi, distinguendosi dall'obsoleta pratica della variolizzazione e la moderna vaccinazione. Viene definita la quarantena, spesso usata come compromesso tra salute e necessità di mantenere attivi gli scambi commerciali. Il capitolo prosegue con la definizione del concetto di spillover, causa della maggior parte delle malattie infettive che colpiscono l'uomo e principale fattore di rischio delle probabili future malattie emergenti. Segue un'analisi delle teorie legate alla diffusione delle malattie e come quest'ultime venivano considerate: l'interpretazione divina e sovrannaturale, la teoria degli umori, miasmatica, del contagio e dei germi. Il capitolo rivela come queste interpretazioni

spesso abbiano coesistito tra loro e come una teoria non debba necessariamente escluderne un'altra. In particolare, viene esplorato il dualismo tra la dottrina miasmatica e contagionista, che ha caratterizzato gran parte del dibattito internazionale sulla cooperazione sanitaria durante il XIX secolo. Viene inoltre individuato nella Repubblica di Venezia il luogo di nascita delle prime autorità sanitarie permanenti, come il Magistrato di Sanità. Il capitolo si conclude presentando un caso di studio sull'introduzione del vaiolo nel continente americano, principale motivo del crollo demografico della popolazione indigena e fattore determinante nel facilitare la conquista del continente da parte dei colonizzatori, utilizzato anche come potenziale arma biologica.

Il capitolo due procede con l'illustrazione delle reti d'informazione in epoca moderna, tra notizie vere e notizie false. Da un lato, quest'ultime venivano utilizzate per la condivisione di informazioni riguardanti possibili epidemie in paesi vicini e lontani al fine di poter adottare tempestivamente le necessarie misure preventive. Nel periodo moderno dette notizie si diffondevano per passaparola, lettere e dispacci diplomatici. Dall'altra, non erano rari i casi dell'uso di notizie false per danneggiare i paesi e le città rivali, come avvenuto tra i porti franchi di Genova, Marsiglia, Livorno. Il commercio con paesi infetti, o considerati tali, veniva interrotto causando ingenti danni economici a chi ne era colpito, dando spesso origine a vere e proprie "guerre sanitarie" mediante l'utilizzo di notizie false. La cooperazione sanitaria, la diplomazia ed il commercio rappresentavano degli elementi strettamente collegati. Il capitolo due prosegue con le politiche sanitarie della Repubblica di Venezia a tutela della salute pubblica ed il loro ruolo come modello internazionale.

Viene inoltre dimostrato che uno dei principali attori nella creazione di una rete di politiche sanitarie condivise e riconosciute a livello internazionale era rappresentato dalla Repubblica di Venezia. Le politiche sanitarie del "modello veneziano" godevano infatti di un certo grado di consenso da parte delle potenze mediterranee. Spesso però quest'ultime venivano imposte in modo arbitrario e discriminatorio a difesa degli interessi della Repubblica e a discapito delle potenze rivali. Il capitolo sostiene che le politiche sanitarie di Venezia non erano uno strumento neutrale a difesa della salute pubblica, ma parte integrante della sua politica estera. Vengono poi esplorate le reti internazionali delle stazioni di quarantena e le patenti di sanità, evidenziando il loro profondo impatto sul commercio, chiarendo in che modo abbiano contribuito a mantenere attivi, seppur rallentati, gli scambi commerciali. Seguendo l'ordine cronologico dell'evoluzione della cooperazione sanitaria, questo capitolo tratta anche l'importante passo verso una maggiore globalizzazione della lotta contro le malattie infettive. In tal senso, le numerose campagne di vaccinazione internazionali contro il vaiolo del XIX secolo possono essere considerate come l'espressione di un approccio moderno di contrasto e prevenzione, con tratti molto simili a campagne internazionali più recenti.

Con l'aumento esponenziale del commercio internazionale nella seconda metà del XIX secolo si era acceso il dibattito internazionale sui regolamenti sanitari relativi alla quarantena. Questo capitolo dimostra come le questioni economiche e politiche riguardo l'impatto della quarantena sul commercio internazionale abbiano portato alla richiesta di riformare e standardizzare le regole sanitarie nei paesi del Mediterraneo. Avendo esposto le criticità del sistema dei lazzaretti e delle stazioni di quarantena, si dimostra come il dibattito internazionale sia culminato nella prima Conferenza Sanitaria Internazionale di Parigi nel 1851, seguita dalle successive conferenze sanitarie.

Il capitolo tre prende in considerazione eventi più recenti. Viene analizzata la campagna di eradicazione del vaiolo degli anni Settanta, portata avanti con successo e con sforzo congiunto tra Stati Uniti e Unione Sovietica, nonostante le tensioni geopolitiche della Guerra Fredda. Tuttavia, la cooperazione sanitaria contro il vaiolo si è rivelata paradossale. Da un lato, le due superpotenze hanno collaborato per raggiungere l'eradicazione del virus a difesa della salute pubblica globale; dall'altro, la campagna di vaccinazione veniva considerata con mutuo sospetto e, in una certa misura, intesa come un efficace strumento per vincere la Guerra Fredda. L'elaborato prosegue con l'analisi di un caso specifico di campagna di disinformazione riguardante le malattie epidemiche: l'operazione segreta con nome in codice "Operazione Denver" sull'AIDS, ideata dai servizi segreti sovietici. La campagna di disinformazione sull'AIDS rappresenta uno dei più evidenti casi di manipolazione dell'opinione pubblica, sfruttando una malattia epidemica per danneggiare l'immagine di una potenza rivale e trarne un vantaggio strategico. Si evidenzia quindi come sia nel periodo moderno e sia nel periodo contemporaneo si è spesso fatto ricorso alla divulgazione di notizie false in merito alle malattie epidemiche.

Il capitolo prosegue con un'analisi della risposta internazionale contro il COVID-19 con particolare attenzione data al ruolo svolto dell'Organizzazione Mondiale della Sanità nelle prime fasi dell'emergenza sanitaria. Vengono evidenziati gli indubbi passi in avanti nell'implementazione di un sistema di risposta e sorveglianza epidemiologica su scala globale, ma che riscontra ad oggi importanti limiti ed imperfezioni. Tra le problematiche principali, si evidenzia l'assenza nel diritto internazionale, di strumenti idonei a garantire un efficace sistema di controllo dell'adempimento agli obblighi previsti dal Regolamento Sanitario Internazionale e di sanzione nei confronti degli stati inadempienti. Segue un'analisi della campagna di vaccinazione globale COVAX, al cui riguardo viene introdotto il concetto di "nazionalismo vaccinale", che si riferisce alla capacità delle nazioni più ricche di assicurarsi grandi quantità di vaccino, a danno dei paesi più poveri, incapaci di procurarsi le dosi sufficienti in grado di soddisfare la propria domanda interna. L'elaborato si conclude con un'investigazione sui principali rischi futuri legati alla comparsa di malattie infettive e di come la

comunità internazionale possa farne fronte tramite il diritto internazionale. In particolare, tra i rischi principali viene rilevato il rilascio accidentale o deliberato di agenti patogeni in natura, la resistenza agli insetticidi da parte di alcune specie di zanzara quale vettore di malattie, alle attività umane legate alla deforestazione e conseguente perdita di biodiversità, il commercio di animali selvatici e, infine, tra i più incisivi, il riscaldamento globale.

GLOSSARY OF ACRONYMS AND ABBREVIATIONS

AIDS	Acquired Immunodeficiency Syndrome
AMWG	Active Measures Working Group
BTWC	Biological and Toxin Weapons Convention
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
COVID-19	Coronavirus disease
CSMQ	Conseil sanitaire maritime et quarantenaire d'Égypte (Sanitary Maritime and Quarantine Board of Egypt)
DDT	Dichlorodiphenyltrichloroethane
EU	European Union
GATS	General Agreement on Trade in Services
GATT	General Agreement on Tariffs and Trade
GDR	German Democratic Republic
HIV	Human Immunodeficiency Virus
ISC	International Sanitary Conference
KDS	Komitet za dăržavna sigurnost (Committee for State Security, Bulgaria)
KGB	Komitet Gosudarstvennoj Bezopasnosti (Committee for State Security, Soviet Union)
LNHO	League of Nations Health Organisation
MEP	Malaria Eradication Program
MfS	Ministerium für Staatssicherheit (Ministry for State Security, East Germany)
NATO	North Atlantic Treaty Organization
OIHP	Office international d'hygiène publique (International Office of Public Hygiene)
PASB	Pan American Sanitary Bureau
PHEIC	Public Health Emergency of International Concern
PPP	Potential Pandemic Pathogen
SARS	Severe acute respiratory syndrome

SDI	Strategic Defense Initiative
SEP	Smallpox Eradication Program
SPS	Agreement on the Application of Sanitary and Phytosanitary Measures
TBT	Agreement on Technical Barriers to Trade
TCDC	Taiwan Centers for Disease Control
TRIPS	Agreement on Trade-Related Aspects of Intellectual Property Rights
U.S.	United States
U.S.S.R.	Union of Soviet Socialist Republics
UN	United Nations
USIA	U.S. Information Agency
WHA	World Health Assembly
WHO	World Health Organization
WWF	World Wide Fund for Nature

INTRODUCTION

The theme of this work is an analysis of the evolution of international sanitary cooperation from the Early Modern Period to the present day. The writing of this master's degree's thesis began during one of the most significant and disruptive health emergencies of contemporary times: the COVID-19 pandemic. This event spurred my interest in the topic, as it unveiled many unexpected fragilities within the field of international relations and in modern society at large. Epidemic diseases have always been among the major challenges that humans had to face since they relied on agriculture and developed a settled lifestyle. Cities and towns' populations grew, and sustained contacts among different communities increased the spread of diseases. Eventually, epidemic diseases accompanied humankind through its first steps toward civilisation, heavily shaping the development of modern society.

Many countries pursued sanitary cooperation initiatives when the awareness of the cross-border nature of numerous epidemic diseases and their intimate connection with international commerce led to the need for an international response. Infectious diseases do not respect national borders, and, arguably, the fight against them is essentially an international cooperation issue. As pointed out throughout this work, often, the action of a single government cannot be considered enough to provide a solution. The inaction — or incapability — to control infectious diseases of one community can have adverse effects on another and potentially escalate contagion globally. Consequently, public authorities and individuals have had an enhanced interest in standard health policies that would benefit countries' public health and economy since the Early Modern Period.

Despite the lack of clear sanitary agreements, it is possible to identify the Early Modern Period as the birthplace of the idea that sanitary cooperation at the international level proves beneficial. Numerous actors have been involved since then, varying from public health authorities instituted in the 15th century, governments, individual philanthropy, and civil society at large. Because of the multitude of actors involved, it is helpful to identify a leading force in such an increased desire for cooperation. There is a broad consensus that the Republic of Venice assumed the leading role during the Early Modern Period, which established an internationally recognised system of health regulations until its decline. Others, like France, led the first sanitary international conferences, which brought together twelve countries in 1851. Several Italian states can also be considered a leading actor in advancing certain health practices during the Early Modern Period. Eventually, supranational bodies like the European Union and the World Health Organization took the lead, the latter on a global scale.

It is important to note that this work addresses exclusively infectious diseases. Henceforth, many health conditions and chronic illnesses caused by non-infectious pathogens will not be considered. Non-infectious diseases ignited the share of information and sanitary cooperation as well. Still, they require a separate analysis from infectious diseases as the reactions of the involved actors to them are different. A significant part of sanitary practices that led to an increased international cooperation during the past and even today are related to the infectiousness of certain diseases. In this regard, specific reactions of fear and anxiety can be linked to the desire to share information and establish a certain degree of international cooperation, as the wellness of an individual or a country reflects in someone else's health. However, during such a process, a significant degree of competition — instead of cooperation — took place, and the interests of one country overlapped with the good of another.

Little attention has been shown by the scholarly debate on the origins of the initiatives taken to control the spread of epidemic diseases, especially before the numerous sanitary conferences of the 19th century. During and after those conferences, the speed with which states attempted to converge their health policies through negotiations increased exponentially. What was the origin of such desire? What were the outcomes of such an extraordinarily long and complex process? What was the historical context during which the international debate took place? What were the diseases that were primarily included in the international debate? It is the object of this document to address this research gap. Undoubtedly, present-day international cooperation reached an unprecedented level. Therefore, the question that naturally arises is: how did contemporary society get to this point? In answering these questions with a holistic approach, this thesis encompasses historical research with contemporary phenomena.

This work aims not to address the single steps taken to develop health regulations internationally in their finest detail but to capture and reflect the overall development of health policies and the historical context in which they have been decided. Henceforth, this thesis aims to provide a valuable contribution to understanding the evolution of international sanitary cooperation from the Early Modern Period to the present day. This study uses a global approach for analysing the long period considered. For historical reasons and the sake of clarity and economy of space, a greater emphasis is given to Europe and the Mediterranean region, and to a secondary degree, North America.

This work introduces past and contemporary medicine, elements of intellectual history, religion, and scientific notions to reach its goal. It also considers the reactions of governmental bodies and individuals in respect of their counterparts during sanitary emergencies. In doing so, this work

analyses how different populations interacted with each other while they dealt with epidemic diseases. In this regard, the first steps toward harmonising sanitary practices can be found in the cross-country share of information and the establishment of quarantine stations. Such methods aimed to reduce the impact of diseases on commerce, the economy, and the population's general health. However, international cooperation cannot be understood as a steady process of improvement from its origins to the present day. In this regard, simultaneously with the development of increased cross-border cooperation, another element must be considered: international sanitary competition.

The primary analysis method consists of reviewing existing books, reports, articles, and scientific research published over more than two centuries. The older works used for writing the first and second chapters were published mainly during the 18th and 19th centuries, and they have been consulted in their digitalised versions available on the internet. The third chapter, being the most recent and under constant updating due to the ongoing COVID-19 pandemic, relies extensively on online publications. Noteworthy, all translations provided, except where otherwise clearly indicated, have been made by the author of this work.

This dissertation consists of three chapters and is structured as follows. The first chapter provides the background notions needed to understand the rest of the work and a case study on smallpox. This opening chapter defines the most recurring terms and keywords of this document. Henceforth, with chapter 1.1, readers can familiarise themselves with recurrent words like outbreak, epidemic, pandemic, and endemic. Eventually, various medical practices were developed as society tried to cope with infectious diseases. As a result, this chapter defines terms like variolation and vaccination. This chapter continues by addressing the word quarantine. Then, spillover is defined to explain the origins of several diseases and provides basic information needed to understand the last chapter of this thesis dealing with present and future challenges.

Additionally, chapter 1.2 provides a historical introduction to medical practices and interpretation of diseases in the past. To this end, various theories on the interpretation of diseases are addressed, like the divine and supernatural theory, humoral medicine, miasmatic and contagionist theories, together with the nowadays accepted germ theory. It then explores the origins of the so-called health magistrates as they were the first example of public authorities with a specially designed role in the contrast and prevention of diseases. This chapter moves forward with a brief introduction of the complex exchange of diseases from the 14th century to the last decades of the 19th century. Therefore, the most significant diseases for the theme of this work are addressed. The final part deals with a case study on smallpox, focusing on the period between the 16th century to the 19th century. It

aims to understand how smallpox was perceived, how people reacted to it, its effects on demography, its use as a biological weapon, and how governments organised an international response through quarantine stations.

Chapter 2 examines the origins of international sanitary cooperation. After a brief introduction, it starts the analysis discussing the creation of information networks used by cities and states to cooperate and compete in the Mediterranean Sea. It provides the example of the Republic of Venice, which was one of the most significant powers in the region that devoted great attention to health policies. Subsequently, it introduces the international network of lazarettos and the bills of health used by governments and health authorities to prevent the entry of importable diseases. Such a network was one of the first attempts, albeit limited, to create a harmonised set of practices to allow commerce to flow while keeping it safe for countries. The chapter addresses one of the first examples of international sanitary cooperation during the 19th century through cross-border vaccination campaigns: the Spanish and British international vaccination expeditions, the distribution of vaccines in North America, and the public vaccination campaign in Napoleonic Italy. The following section provides a historical analysis of the 19th century, a worthwhile period heading toward a modern international sanitary system before the sanitary conferences. Eventually, the Paris Conference of 1851, generally considered a breakthrough in international sanitary cooperation, is addressed. The last part of this chapter briefly explores the other significant sanitary conferences of the second half of the 19th century and the first half of the 20th century.

Chapter 3 considers significant events starting from the mid-1960s, a time of increased awareness of the idea that diseases could not only be fought and kept outside countries' borders but could be chased and driven to complete eradication. The first section explores the global vaccination campaign that successfully eradicated an infectious disease: smallpox, for the first time in history. The author finds it interesting that the vaccination campaign was implemented during the Cold War and was primarily developed and carried out by the two confronting parties. It shows that international sanitary cooperation can find its way to success despite political and economic rivalries. The successive section considers the AIDS disinformation campaign during the Cold War, exposing how and to what extent fake news about diseases to damage rivals was not a prerogative of the past but a well alive trend that in the 1980s acquired tremendous momentum. Chapter 3.3 considers the ongoing COVID-19 emergency and the role of the World Health Organization and the COVAX vaccination program, one of the most considerable efforts to distribute vaccines globally. Yet, this chapter exposes the vaccination campaign's limits and flaws, introducing the concept of vaccine nationalism. The last part of this chapter addresses new possible challenges. To this end, the dangers linked with biological

warfare, biosafety and bioterrorism are addressed. The chapter also considers the challenges derived from the emergence of new and past viruses directly resulting from global warming and other driving factors linked to human activities. Finally, the chapter attempts to assess whether current international law is sufficiently prepared to confront the new challenges and to what extent it can prevent them.

CHAPTER 1 UNDERSTANDING EPIDEMIC DISEASES

Introduction

Some of the recurrent terms in this work must be first defined and explained to avoid possible confusion. For example, the sudden emergence and rapid spread of the H1N1 influenza virus in early 2009 has caused confusion over the meaning of "pandemic". Even in recent times, a similar issue occurred with the global spread of the SARS-CoV-2. For example, the heavy debate over the meaning of pandemics within the scientific community and the media's extensive use of related terms amplified the confusion. When the novel COVID-19 (Coronavirus disease) spread to more than a hundred countries, it may have fit within the commonly accepted definition of a pandemic. Yet, it was not defined as such only significantly later. On the contrary, widespread diseases like AIDS/HIV and malaria are still considered epidemics.

Henceforth, the importance of having a worldwide standard definition reflects on the ability and preparedness of governments and international institutions to effectively deal with new emerging infectious diseases. In this regard, confronting a pandemic enables greater resources, such as financial manoeuvres, political will, and state power. Additionally, dealing with a pandemic may require more significant international cooperation, including providing aid to affected countries and a more effective network of information and funds to boost scientific research and medical treatments. It may also require exceptional measures that can justify a reduction of fundamental liberties during the health crisis, such as travel restrictions or the imposition of temporary lockdowns that would not be normally accepted anytime else.

Avoiding confusion over terms used by experts and politicians would help gain public support and cooperation. If the "epidemic fight is up to the people",[1] as remarked by Herman Morgan, the Secretary of Indianapolis' Board of Health during the Spanish Flu of 1918, then the public ought to be adequately informed to avoid confusion, panic or, far worse, lack of cooperation. Thus, this chapter aims to provide the basic background information necessary to understand the rest of the work and to provide useful keywords' definitions. Finally, this chapter ends with a case study on smallpox during the modern period in the American continent.

[1] Morgan, H. G. (1919, November 19). Epidemic fight is up to the people. *Indianapolis News*, p.1. Retrieved September 19, 2021, from https://newspapers.library.in.gov/?a=d&d=INN19181119-01&e=-------en-20--1--txt-txIN-------

1.1 BACKGROUND INFORMATION

1.1.1 OUTBREAK – EPIDEMIC – PANDEMIC – ENDEMIC

A disease "outbreak" can be defined as the "occurrence of cases of disease in excess of what would normally be expected in a defined community, geographical area or season".[2] It usually denotes a sudden increase of infections of a given disease with little prior notice. An outbreak can last for a short or long period, and the number of cases needed for an outbreak depends on the specific disease. It is possible to refer to an outbreak even if one case of an infected person is reported when such a disease is "unknown, new to a community or absent from a population for a long time".[3]

The word "epidemic" has a long history. English borrowed it from the French *épidémique* of Latin origins, which comes from the Greek. "*Epi*-" means "on, over, or at", and "*dēmos*" stands for "people". It refers to a disease that affects a specific population in a limited geographical area. In English, the first reported use of this word — spelt as "ipedemye"[4] — was found in letters written by John Paston in 1472. Epidemics can be defined as "the occurrence in a community or region of cases of an illness, specific health-related behaviour, or other health-related events clearly in excess of normal expectancy".[5] Other definitions include "an occurrence of disease that is temporary of high prevalence."[6] In the existing literature, when used as nouns, "epidemic" and "outbreak" frequently carry the same meaning. Still, an outbreak usually refers to an event more geographically limited.

The word "pandemic" comes from the Greek "*pándēmos*". It is composed of "*pan*-", which means "all", and "*dēmos*". Therefore, a pandemic is a disease that affects all people and not a specific population, town, or country. The World Health Organization (WHO) is the international body in charge of declaring a pandemic when conditions are met, that is, when a disease grows exponentially and spreads globally. Yet, it did not formally define such a term (Singer & et al., 2021). A pandemic is usually defined as "an epidemic occurring worldwide or over a very wide area, crossing international boundaries, and usually affecting a large number of people"[7] and as a "widespread

[2] World Health Organization. (n.d.). *Disease outbreaks*. Retrieved August 29, 2021, from World Health Organization: http://www.emro.who.int/health-topics/disease-outbreaks/index.html
[3] Robinson, J. (2020, April 02). *Pandemics*. Retrieved August 30, 2021, from WebMD: https://www.webmd.com/cold-and-flu/what-are-epidemics-pandemics-outbreaks#1
[4] Gairdner, J. (Ed.). (1895). *The Paston Letters: 1422-1509 A.D.* (Vol. 3). Westminster: A. Constable & Co. p.59.
[5] Porta, M. (Ed.). (2008). *Dictionary of Epidemiology* (5th ed.). Oxford University Press, p.79.
[6] Britannica. (2020, March 5). *Epidemic*. Retrieved August 16, 2021, from Britannica: https://www.britannica.com/science/epidemic
[7] Porta, M. (Ed.). (2008). *Dictionary of Epidemiology* (5th ed.). Oxford University Press, p.179.

epidemic distributed or occurring widely throughout a region, country, continent, or globally".[8] Even if the term "pandemic" can be used generally to describe something that exists anywhere, including human emotions like "fear",[9] it will be used exclusively for its epidemiological meaning throughout this work. Overall, it is important to note that "pandemic" only refers to the geographical widespread and not the number of infected people or its deadliness. More briefly, it is about "literal geography".[10]

In the English language, the word "pandemic" was first used in 1666 by Gideon Harvey in his *Morbus Anglicus* spelt "pandemick".[11] However, it carried a different meaning as the author intended it as a synonym for "endemic". Examples of pandemics are the Black Death, the plague that ravaged Europe in the 14th century, the 1918 flu caused by the H1N1 virus, the 2009 H1N1 swine flu, and the most recent COVID-19.

Likewise, "endemic" comes from the Greek "*en*", which means "in" and "*dēmos*". It is defined as the "constant presence of a disease or infectious agent within a given geographic area or population group".[12] It first appeared in English, once again, with Harvey in 1666. Frequently, once introduced in a territory, many diseases tend to become endemic. The plague, for instance, when it entered the south of the Italian peninsula in 1347, became endemic in the European continent with numerous outbreaks until the 17th century.

1.1.2 Inoculation – Variolation – Vaccines – Vaccination

In addressing smallpox, communities often recurred to preventive measures through inoculation to reduce the disease's impact on the population. Inoculation is the process of inserting an antigenic substance (for example, a small amount of viral matter or a vaccine) into the body in order to trigger an immune response against a specific disease. Variolation consisted of deliberately transferring viral matter from a patient with smallpox to a healthy subject in the hope of preventing a natural attack by smallpox. Mid-16th century China practised variolation, and by mid 17th century, it was commonly administered also in Africa. Accounts of such practice can also be found in India and the Middle East.

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[8] University of Maryland. (2000). *Pathogenic Microbiology. Summary of Host-Parasite Interactions*. Retrieved August 16, 2021, from University of Maryland: http://science.umd.edu/classroom/bsci424/HostParasiteInteractions/HostParasiteSummary.htm

[9] American Heritage Dictionary of the English Language. (2016). *Pandemic*. (5th ed.) Retrieved August 16, 2021, from The Free Dictionary: https://www.thefreedictionary.com/pandemic

[10] Epidemiologist Rivers Caitlin's remarks, as reported by Wan, W. (2020, March 11). *WHO declares a pandemic of coronavirus disease COVID-19*. Retrieved August 30, 2021, from The Washington Post: https://www.washingtonpost.com/health/2020/03/11/who-declares-pandemic-coronavirus-disease-COVID-19/

[11] Harvey, G. (1674). *Morbus anglicus or a theoretick and practical discourse of consumptions and hipochondriack melancholy*. London: William Thackeray, p.2. (Original work published in 1666).

[12] Porta, M. (Ed.). (2008). *Dictionary of Epidemiology* (5th ed.). Oxford University Press, p.78.

In China, the scab material from an infected person was powdered and inhaled through the nose by the patient that needed to be inoculated. In India, the patient would be inoculated with several punctures in the arm with a needle previously dipped in the pus material of an infected person. Typically, patients subjected to variolation were children.

The practice of variolation was introduced in Europe in the 18th century (the term variolation and inoculation was used interchangeably back then), and it was commonly administered by doing an incision in the arm and inserting pustular fluid. One of the first accounts of smallpox inoculation in Europe can be traced as early as 1721 in England. There, the idea of inoculation came from Lady Mary Montagu on her return from Constantinople, where she observed it for the first time.[13] Far from being a generalised practice at the time, it nevertheless raised interest in the method by local physicians (Miller, 1955). Soon after, the Royal Family adopted smallpox variolation as well. It is worthy of mention that a physician can be defined as "a medical doctor, especially one who has general skill and is not a surgeon".[14]

The practice itself carried considerable risks because recently inoculated patients were contagious. English doctor and member of parliament Thomas Dimsdale wrote in the late 18th century that moisture taken from immunised individuals was "capable of communicating smallpox with the utmost certainty".[15] Moreover, he warned other physicians of the contagiousness of recent inoculated patients (Dimsdale, 1779). Noteworthy, the risk of contagion following variolation was already known several centuries earlier. For example, in China, recently inoculated patients were isolated. Variolation also spread into the American continent. It was presumably introduced in Central and South America by Spain and Portugal, but it was not widely used until the last decades of the 18th century. However, in North America, variolation was likely introduced by clergyman Cotton Mather after learning about the practice from an enslaved person. Variolation was used more extensively already by the first half of the 18th century. The practice was soon replaced by the considerably safer vaccination, even though the last cases of variolation were documented in the late 1970s in Ethiopia and Afghanistan (Williams, 2010).

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[13] An extract of the letter of Mary Wortley Montagu to Mrs. S.C. on April 1717 reads as follow: "*The small-pox, so fatal, and so general amongst us, is here entirely harmless […] People send to one another to know if any of their family has a mind to have the small-pox; they make parties for this purpose […] The old woman comes with a nut-shell full of the matter of the best sort of small-pox, and asks what vein you please to have opened. She immediately rips open that you offer her, with a large needle […] and puts into the vein as much matter as can lie upon the head of her needle."*
Montagu, M. W. (1797). *Letters of the Right Honourable Lady Mary Wortley Montague* (Vol. 1). Vienna: R. Sammer, p.193.

[14] Cambridge Advanced Learner's Dictionary & Thesaurus. (n.d.). *Physician*. Retrieved September 20, 2021, from Cambridge Advanced Learner's Dictionary & Thesaurus: https://dictionary.cambridge.org/dictionary/english/physician

[15] Dimsdale, T. (1767). *The present method of inoculating for the small-pox* (3rd ed.). London: W. Owen, p.27.

The terms vaccine and vaccination derive from *Variolae vaccinae*, which means smallpox of the cow. It was coined by Edward Jenner to address cowpox and used in his book *Inquiry into the Causes and Effects of the Variolae Vaccinae.* Cowpox is a sporadic disease found in cows, which is relatively milder than smallpox. The word vaccination was used by Richard Dunning at the beginning of the 19th century, and simultaneously the word vaccine passed from being used as an adjective to a noun (Baxby, 1999a). During most of the 19th century, the words "vaccine" and "vaccination" were used to indicate the administration of cowpox into humans. Precisely, vaccination consisted of infecting an individual with cowpox which grants immunity to smallpox.

Nevertheless, during the 19th century, numerous vaccines against smallpox were also obtained from horsepox and presumably with smallpox itself (Baxby, 1999b). Eventually, the dominant strain used for vaccination was the vaccinia virus which is different from cowpox (Downie, 1939). However, vaccinia's origins remain unclear, and recent vaccina strains were found in vaccines used in the mid-19th century (Duggan et al., 2020).

However, the modern meaning of vaccine beyond the connection with cowpox was used for the first time by Louis Pasteur by the late 19th century when he successfully developed and administered a vaccine against rabies (Simmons, 2002). Originally, vaccination was first introduced in England by Edward Jenner, who studied the relation between milkmaids who had contracted cowpox and their immunity to smallpox. By 1796, Jenner's studies led to the development of the first effective vaccine in history. With this practice, Jenner aimed at the "annihilation of the smallpox",[16] which he considered "the most dreadful scourge of the human species".[17]

1.1.3 Quarantine

The term "quarantine" derives from the Italian "*quarantena*", which means "forty days", and its use in English can be traced as far back as the 17th century. It can be defined as a "condition, period of time, or place in which a person, animal, plant, vehicle, or amount of material suspected of carrying an infectious agent is kept in confinement or isolated to prevent the disease from spreading."[18] Nowadays, the terms quarantine and isolation can be used interchangeably.

[16] Jenner, E. (1801, June). On the Origin of the Vaccine Inoculation. *The Medical and physical journal*, 5(28), p.508.
[17] Ibid.
[18] American Heritage Dictionary of the English Language. (2016). *Quarantine*. (5th ed.) Retrieved August 16, 2021, from The Free Dictionary: https://www.thefreedictionary.com/quarantine

The Republic of Venice first introduced quarantine during the Black Death in the 14th century. The isolation period of forty days was enforced mainly on ships coming from the Levant to manifest possible diseases and to dissipate possible infections among the crew members and goods. However, isolation for vessels coming from places where the plague was endemic was set up by the Great Council of the Republic of Ragusa in 1377 for a period of thirty days named "*trentino*". Eventually, the duration changed from thirty days to forty. It is unclear whether the length of quarantine was a biblical reference or because it was deemed to be more effective. What is certain is that it was adopted at a global scale in different variations and duration to prevent the entry of several diseases considered to be contagious.

1.1.4 Spillover

Infectious diseases can be transferred from one species to another through spillover, which happens when a host species with a high prevalence of pathogens enters in contact with a host population of a different species. The disease then passes from the reservoir host population to the other (Power & Mitchell, 2004). In doing so, the virus must overcome the incompatibility of species and the new host's immune system response. Generally, spillover can be considered a rare event and depends on certain factors, such as the different species' interaction levels and population density (Ryding, 2021).

When the pathogen transmission happens from an animal to a human, it is called zoonoses, and more than two-thirds of human viruses derive from this process (Woolhouse et al., 2012). Overall, 75 per cent of emerging diseases[19] are zoonotic (Taylor et al., 2001). A possible example of spillover to humans by a zoonotic virus is SARS-CoV-2 which caused the COVID-19 pandemic. However, the host species has not been identified yet. Despite a wide margin of uncertainty, leading evidence links the spillover to intermediate species like bats or pangolins (Cyranoski, 2020). Similarly, smallpox is believed to have infected humans following a mutation from a cowpox-like virus (Babkin & Babkina, 2015).

[19] Emerging diseases can be defined as "*diseases that are rapidly increasing their incidence in humans for the past two decades or threaten to increase in the near future. These diseases […] can challenge efforts to protect workers as prevention and control recommendations may not be immediately available*." Centers for Disease Control and Prevention. (2018, March). *Emerging Infectious Diseases*. Retrieved August 19, 2021, from Centers for Disease Control and Prevention: https://www.cdc.gov/niosh/topics/emerginfectdiseases/default.html

1.2 HOW DISEASES WERE PERCEIVED IN THE PAST

To better understand the preventive sanitary measures developed in the past, it is essential to provide basic background information on how diseases were perceived. Numerous theories tried to explain the origins of diseases and how they spread among humans. Ultimately, such preventive measures and the general adverse effects on population and economies led to a more comprehensive approach to international sanitary cooperation. It is crucial to notice that the development of different theories often was not temporally sequential, and many of them coexisted simultaneously.

Almost always, at least until the second half of the 19th century, such different theories mixed. For example, the plague was generally considered a contagious disease already by the 14th century during the spread of the Black Death, which was simultaneously linked with divine punishment. Then, by the 17th century, the contagion nature of the plague was put under discussion by experts of the time. In this regard, many physicians suggested a miasmatic explanation. Later, with the advancement of medicine as a rational scientific discipline, the contagionist theory gained back its importance.

Furthermore, it is worthy of notice that medical theories are linked with numerous factors. For example, theories are connected with the available technologies, scientific discoveries, economic and political factors. For example, the anti-contagionist movement that gained momentum during the second half of the 19th century to explain the spread of cholera was profoundly linked to the economic losses related to the quarantine of people and goods in a historical period of unprecedented global trade. Different theories on the origins of diseases will be introduced in the following subchapters to provide the necessary information for a clearer understanding of this work. Such theories are the divine and supernatural interpretation of diseases, humoral medicine, miasma, and contagion theories.

1.2.1 Divine and Supernatural interpretation

For most communities of the Modern Era, the divine interpretation was one of the prevalent theories that aimed to explain the origin of diseases. In this way, illnesses were perceived to be sent by a superior divine being, for example, the Christian God. The Bible contains evidence of such interpretation, claiming that diseases resulted from Adam and Eve's disobedience, which doomed humanity to suffer. During many epidemics, divine interpretation plays an integral part in framing most diseases. For instance, the plague was often seen as a punishment against Christians because of their sins. In Venice, the epidemic that affected the city from 1575 to 1577 was considered a form of divine punishment. During the plague, religious activities were carried out systematically, such as collective prayers and processions. After the outbreak, the Church of the Most Holy Redeemer was erected under the Doge's will to appease and thank God, which was thought to be the city's saviour.

A clear example of divine interpretation can also be found in Homer's Iliad, with Apollo's wraith against the Greeks attacking the city of Troy. The Greeks refused to return Chryses, one of Apollo's priests, to the town. Thus, in Homer's narratives, Apollo unleashed the plague by answering Chryses' prayers. Back in the 8th century B.C., when the Iliad was presumably written, diseases were mainly seen as a divine punishment. Henceforth, the spread of diseases and humans' ability to heal from them was under Gods' will. In more extreme cases, preventing the spread of illnesses was negatively considered as an act against the Divine Providence (Schneider & Lilienfeld, 2011).

Likewise, epidemic diseases in the past were also linked to demons, spirits, and other malignant supernatural presences. In North America, for example, Pastor Hale reported that from 1646 to 1692, "several persons have been charged with and suffered for the Crime of Witchcraft".[20] He considered witchcraft a "habitual crime"[21] in the last decade of the 17th century. However, historically, most of the individuals accused of witchcraft were generally dismissed by courts, and no further actions were taken. One of the clearest examples of supernatural malign interpretation is the witchcraft hunt in the village of Salem (present-day Danvers) in 1692. Local experts, including the village physician, failed to diagnose any known disease and finally concluded that afflicted children were "bewitched".[22] The families of the victims were thus "led to apply themselves to fasting and prayer"[23] while the

[20] Hale, J. (1697). *A modest enquiry into the nature of witchcraft*. Boston: B. Green, J. Allen for Benjamin Eliot, p.16-17.
[21] Ibid, p.20.
[22] Upham, C. W. (1867). *Salem witchcraft* (Vol. 2). Boston: Wigging and Lunt, p.14.
[23] Ibid, p.9.

neighbours and other villagers aimed at helping the afflicted children by invoking the "Divine Being to interpose and deliver them from the snares and dominion of Satan".[24]

Eventually, several individuals were identified as the supposed witches who caused the illnesses, which caused painful body contortions and animal-like vocalisations. Although the causes of the diseases that happened in Salem cannot be identified, scholars advanced possible explanations. For example, there may have been a combination of child abuse, hysterical mental conditions and juvenile boredom that led to fake the symptoms. As Caporael (1976) suggested, other explanations can be convulsive ergotism [25] or, as more recent studies suggest, Huntington's disease [26] (Bhattacharyya, 2016). What is important is that public authorities included spectral evidence as a critical part of the court proceedings. Eventually, the court launched a major witchcrafts hunt that led to hundreds of individuals being imprisoned, of which more than fifty were found guilty of witchcraft, and nineteen of them were sentenced to death.

However, the key role that a superior being was supposedly playing in the outbreak of a disease does not exclude other theories, such as its contagion nature. An example is the cordon sanitaire[27] established around Elsinore and surrounding areas in 1711 by King Frederik IV. Since the plague was spreading from the city of Elsinore to nearby villages, a cordon sanitaire was established to stop the further spread of the disease. Evidence of a divine interpretation of disease can be found in the fact that citizens of the cordoned towns were instructed to pray daily to God to ask for the "forgiveness of their sins"[28] and ease their "punishment".[29] To this end, the divine interpretation does not exclude that the disease spread through contagion. Additionally, citizens were instructed to avoid crowded places, create large assemblies, and enter infected houses, which were publicly marked on their front doors. Moreover, homes used to undergo fumigation with herbs and sulfur and similar treatments were practised to letters coming in and from the cordoned places.

[24] Ibid.
[25] Convulsive ergotism is a disorder caused by the ingestion of cereals, typically wheat and rye, contaminated with ergot, a hallucinogenic mushroom.
[26] Huntington's disease is a hereditary neurological condition that affects the brain's functioning, some of its symptoms include involuntary movements, mood swings, personality change and amnesia.
[27] A cordon sanitaire can be defined as "a line around a quarantined area guarded to prevent the spread of a disease by restricting passage into or out of the area". Collins English Dictionary. (2012). *Cordon sanitaire*. William Collins Sons & Co. Retrieved September 22, 2021, from Dictionary.com: https://www.dictionary.com/browse/cordon-sanitaire
[28] Frandsen, K.-E. (2010). *The Last Plague in the Baltic Region, 1709-1713*. Copenhagen: Museum Tusculanum Press, p.270.
[29] Ibid.

1.2.2 Humoral Medicine

One of the most significant breakthroughs in explaining diseases is linked with the introduction of a more rational and secular view of medicine. This shift is commonly associated with Hippocrates in 5th-century Ancient Greece. In Hippocrates' works, the body and its surrounding environment are governed by natural laws only. Thus, he rejected any supernatural or divine interpretation as the sole direct cause of diseases, which was still one of the main accepted theories at the time. To a certain extent, the latter still exists to the present day. It is important to note that humoral medicine did not contrast with the divine interpretation of diseases. Even if humoral theory provided a physical explanation of diseases through natural laws, it was widely accepted that a divine being was in charge of natural events and, therefore, diseases. Furthermore, the Christian church supported and defended the humoral theory during the Middle Ages and beyond.

Natural law was thought to regulate both the macrocosm of the universe and the body's microcosm. The elements in one reflect the elements of the other. Henceforth, according to the humoral theory, the human body comprises four humours. They are the blood (corresponding to air), the phlegm (to water), the yellow bile (to fire) and the black bile (to earth). A healthy body would result from the correct proportion of the four humours. An imbalance, both an excess or a defect, would result in pain and illness. Each humour was associated with one of the body's primary organs, the heart, the brain, the liver, and the spleen. Therefore, it is up to the physician to determine the correct proportion of the humours for each patient. To give a proper diagnosis, the physician had to associate the patient's symptoms with the imbalance of certain humours and prescribe the correct treatment.

For each humour, a specific quality was associated. The blood corresponded to wet and hot, the phlegm to cold and wet, the yellow bile to hot and dry, the black bile to cold and dry. Additionally, each corresponded to a specific temperament of the person that can be respectively sanguine, phlegmatic, choleric, and melancholic. Furthermore, medical treatments were often delivered according to astrology beliefs and in specific months of the year. However, the concept of individual diseases was not considered, and one disease could morph into another indistinctly.

It is worth stressing that the further development of the humoral theory by the Roman physician and philosopher Galen contributed to ensuring that humoral medicine would last for over two thousand years. Eventually, the theory of humours was further developed, and the importance of the humoral-climatic aspects increased. Indeed, such a theory became widely accepted and prominent in western medical thought. Interestingly, humoral medicine was still used in the modern period and

was prevalent among physicians until the 18th century. References to humours can be found later in this document, with the remarks of Benjamin Moseley, one of the most prominent leaders of the anti-vaccination movement by the end of the 18th century. He feared that introducing animal matter into the human body would cause a dangerous mix of animal and human humours, which would violate the natural law. Moseley's assumptions had a considerable impact on the public, which caused a significant slowdown in the advancement of vaccination programs in Britain and abroad.

It is important to note that there is a link between Galen's humoral medicine and the miasmatic theory explained in the next section. In addition to the four natural elements, Galen introduced the six non-natural elements as causes of diseases. They can be defined as "the six non-naturals (things not innate) are air, food, and drink, rest and exercise, sleep and waking, excretions and retentions (coitus), and mental affections."[30] It is mainly in the element of the air that such connection can be found. A corrupted air was considered "miasmatic" and caused a humoral imbalance.

1.2.3 Miasmatic and Contagionist theories

The miasmatic theory assumed that the presence of miasma caused diseases. Miasma, which derives from the Greek "to pollute"[31], can be defined as a "vaporous exhalation formerly believed to cause disease".[32] Another definition is a "poisonous vapour or mist believed to be made up of particles from decomposing material that could cause disease and could be identified by its foul smell."[33] Henceforth, until the last decades of the 19th century, many physicians and people alike believed that diseases were caused by the airborne exhalations and odours derived from rotting organic matter, both from plants and animals and more generally from filth and decay. It was not until the last decades of the 19th century that the miasmatic explanation of disease would be abandoned and surpassed by the germ theory.

It is essential to note that miasma and contagion theories cannot be analysed as two separate or contraposing theories as both contain similar elements. According to the miasmatic theory, the foul, corrupted air composing the miasma could also be transported and passed through merchandise. For example, the miasma could attach to personal cloths, wool and other textile goods and, to a lesser

[30] Garrison, F. H. (1929). *An introduction to the history of medicine* (4th ed.). Philadelphia and London: W.B. Saunders Company, p.113.
[31] Merriam-Webster. (n.d.). *Miasma*. Retrieved September 08, 2021, from Merriam-Webster.com dictionary: https://www.merriam-webster.com/dictionary/miasma
[32] Ibid.
[33] David, C. P. (2021, March 29). *Medical Definition of Miasma*. Retrieved September 08, 2021, from MedicineNet: https://www.medicinenet.com/miasma/definition.htm

extent, letters and personal correspondence.[34] That is why even the miasmatic theory contains some notions of contagiousness. By linking the idea of miasma with the definitions of the words given in chapter 1.1.1, it can be deduced that miasma could be epidemic, as it could be associated with a more or less extent geographical area or pandemic, with a more extensive geographical location covered, moving transnationally. In some places near swamps, it could be considered endemic.

Galen further advanced the miasmatic theory. For example, Galen aimed at explaining the cause of the Plague of Athens through the description made by Thucydides. In reading Thucydides' work, Galen suggested an "excessive heat of the air"[35] and a "flow of putrefying miasmas"[36] coming from Ethiopia as the leading cause of the disease (Jouanna, 2011). However, it is precisely in Thucydides that a notion of possible human-to-human transmissibility of the disease can be found. In his "*History of the Peloponnesian War*", Thucydides observed that "the physicians at first could administer no relief, through utter ignorance; nay, they died the faster, the closer their attendance on the sick".[37] Henceforth, Galen found a miasmatic nature to explain the Plague of Athens where the Thucydides himself did not.

Yet, the idea that diseases could be contagious by contact or proximity is thousands of years old. It is possible to find evidence in the Holy Bible and the Hebrew Bible dealing with leprosy. For example, when a suspected case of leprosy was reported to a priest, he "shall isolate the affected person for seven days".[38] If the disease was confirmed, the infected individual ought to be isolated from the community, and therefore "he shall dwell apart; his dwelling shall be outside the camp".[39] In this context, diseases had a divine explanation.

Contagionists defended firmly their belief that some diseases, namely the plague and rabies, would spread by contact. The case of the Duke of Milan Visconti during the third wave of the plague in the 15th century provides a practical example. Visconti implemented health policies separating the sick from the healthy by removing the formers from the city. However, opinions differed among physicians, debating whether corrupted, humid air was the cause of the disease or whether it spread by touch (Carmichael, 1991). During the Renaissance, a strong impulse in favour of contagion was

[34] The miasmatic theory assumed that various materials reacted differently to the miasma. Denis Vandervelde, as reported by Manaugh & Twilley (2021), suggested that soft materials like cloth and wool together with fruits and vegetables were considered exceptionally vulnerable to miasmatic contagion. On the contrary, hard surfaces like wood and metal were less likely to carry the infection. Documents and letters made of paper stood in between the two extremes.
[35] Translated from French. Jouanna, J. (2011). L'historien Thucydide vu par le médecin Galien. *Comptes rendus des séances de l'Académie des Inscriptions et Belles-Lettres*, 3, p.1461.
[36] Translated from French. Ibid.
[37] Thucydides. (1836). *History of the Peloponnesian War*. (W. Smith, Trans.) Philadelphia: Hogan and Thompson, p. 69. (Original work published in 411 B.C.)
[38] Leviticus 13:4.
[39] Leviticus 13:45.

advanced by Fracastorius in the mid-16th century, suggesting, for example, that typhus, syphilis, and leprosy were contagious and of natural origins.

Fracastorius was convinced to have found the cause of diseases in seeds-like entities, which he called "seminaria". Therefore, Fracastorius stand by the theory of the *contagium animatum*. However, the notion that similar particles could explain diseases was already advanced by Galen (Nutton, 1983). According to Fracastorius, when those particles entered the skin or were inhaled, they multiplied, and when exhaled or spread by touch — whether human touch or through objects — they could infect other people. In his view, organic matter was at the basis of the contagion nature of diseases. It is worthy to notice that he marked a profound shift from previous humoral theories as he affirmed that those seed-like entities were unique for each illness. Furthermore, several Italian states were influenced by the works of Fracastorius, such as the Papal States[40] and the Republic of Venice.

The dualism of contagionists and anti-contagionists, as shown, existed for a long time. During certain periods, one theory prevailed on the other and vice versa. Arguably, during the 19th century, there was a deep divide among ordinary people, as many of them thought diseases spread by contagion. On the contrary, a significant part of the well-educated class of physicians who studied the classic work was anti-contagionists. For example, by the early 19th century, most physicians considered the contagionist theory obsolete. That is ironic because the contagionists finally obtained their victory over the anti-contagionists during the second half of the 19th century. For example, in 1804, naval officer Thomas Trotter dismissed the ideas of *contagium animatum* as "relicts of the old animalcular hypothesis of contagion".[41] He goes forward in denouncing the risks of fumigation, a common disinfection practice involving the use of different gases because it would introduce "foul air"[42] that in turn would allow a chemical reaction responsible for many diseases (Scott, 1942).

At a time of a great revival of the anti-contagionists in England, economic pressures played a crucial role in shaping public and scholarly opinion. The Parliament of England provides an exceptional example of heavy debate over contagionists and anti-contagionists. In this regard, the Select Committee was appointed to discuss the validity of the contagion nature of the plague and reports back to the Parliament. Eventually, the Committee acknowledged that the plague was contagious. In the Western Hemisphere, the North American public authorities were discussing the same matter almost simultaneously.

[40] Fracastorius was elected to the Council of Trent, serving Pope Paul III. He successfully suggested to move the Council to Bologna (Morgan E. , 2021), which was under the Papal rule. Eventually, the Council moved there in March 1547.
[41] Scott, H. H. (1942). *A History of Tropical Medicine* (Vol. 1). Baltimore: The Williams & Wilkins Company, p.29.
[42] Ibid.

Interestingly, even the most convinced anti-contagionists, such as the physician Charles M'Lean, accepted that some diseases, such as smallpox, were inherently contagious. Yet, M'Lean stressed that quarantine was useless, as people infected with plague in a lazaretto would have "arrived with the disease upon them, produced by the air which they had left, or that of the ship, or the goods, or the lazaretto itself".[43] He also stressed that the disease would not spread if brought to England.

Furthermore, when quarantine policies were still under debate, Macmichael (1825) stressed the risks of the potential lack of harmonisation of sanitary practices across European countries. If England removed restrictive quarantine laws and adopted the notion of non-contagiousness of the plague publicly, then its neighbouring countries ought to do the same, or else England would suffer a backlash. As he pointed out, if the restriction were eased in England, then "the immediate result will be, that in the ports of Italy, France, and Spain, every English vessel will be put in quarantine".[44] Henceforth, a certain degree of international sanitary cooperation was needed if the trade was to be preserved, either with a uniformed law or with mutually recognised quarantine stations. If a country would go in the opposite direction than its neighbours with contrasting health policies, then it would be excluded by the sanitary network, and the flow of people and merchandise would suffer even more.

However, the great debate between contagionists and anti-contagionists came partially to an end by the second half of the mid-19th century with the acceptance of the germ theory. The germ theory resulted from numerous works on micro-living organisms deemed to be the cause of specific diseases. Anton van Leeuwenhoek took the first important step into developing the germ theory at the end of the 17th century. He discovered the presence of minor living forms on textile surfaces, which he labelled "animalcules". He went on with his discoveries, which led him to see bacteria through magnifying lenses, even though his contemporary scholars cast doubts about the existence of such living creatures. Eventually, members of the Royal Society of London confirmed Leeuwenhoek's discovery. Regarding the development of the germ theory, an international network of information was necessary to develop, spread and affirm the scientific knowledge that eventually allowed such a theory to be globally accepted.

Despite the proven existence of such living organisms, they were not readily linked with the origins of diseases. It was not until the last decades of the 19th century that the link between germs and diseases was finally accepted. Yet, several scientists believed that those creatures were responsible for originating diseases (Snowden, 2019). Evidence of such connection can be found in

[43] Select Committee on the Doctrine of Contagion in the Plague. (1819). *Report on the Select Committee*, p.11.
[44] Macmichael, W. (1825). *A brief sketch of the progress of opinion on the subject of contagion; with some remarks on quarantine*. London, p. 12-13.

John Burdon Sanderson's remarks about cattle plague as he recognised that the blood of an infected animal "contains an agent which can produce the plague in another animal".[45]

Subsequently, Pasteur's experiments played a crucial role in shaping scientific thought. He proved that by heating an infusion and exposing it to the air while avoiding particulate matter to enter (thanks to the S-shaped "swan neck" of the glass container used), it would not putrefy. On the contrary, the infusion did putrefy by allowing air to freely enter by simply leaving the container open with the S-shaped neck removed. The experiment was repeated by keeping the S-shaped neck in place but tipping the container to the point that the infusion would contact the bent part of the neck exposed to the outside, which caused putrefaction. He concluded that the source of putrefaction was not inside the infusion but outside.

Soon after, Koch's studies further developed and proved the germ theory. The 19th century proved to be decisive in confirming the germ theory. In trying to isolate cholera, two international missions in Egypt, one German and one French, the latter funded under Pasteur's initiative, attempted to link the many vibrions systematically found in some patients as the causative agent of cholera. It is worth noting that the possible connection between the vibrions and the disease was already theorised by Filippo Pacini (1854) in Florence. Eventually, Koch moved to India from Egypt under British suggestions (Howard-Jones, 1984) and finally proved that a bacillus was the causative agent for cholera by officially isolating it in pure culture in 1884.

Interestingly, the isolation of cholera can be framed within a competitive scientific approach as pointed out by Evans (1987), who remarked that the race among Europeans, primarily Germans, French and British, to discover the pathogen was an example of a "furious competition to conquer the disease in the name of science".[46] Likewise, Huber (2006) affirms that scientific discovery, particularly of cholera, became a "realm of national competition".[47] Eventually, scientists developed, proved, and accepted the contagionist theory, and the anti-contagionist view lost its influence. Nowadays, the germ theory is scientifically accepted.

[45] Reports from the commissioners. (1866). Third report of the Commissioners appointed to inquire into the origin and nature of the cattle plague. In *Reports from Commissioners* (Vol. 22). London: George Edward Eyre and William Spottiswoode for H.M.S.O., p.4.
[46] Evans, R. J. (1987). *Death in Hamburg: society and politics in the cholera years, 1830-1910*. Oxford: Clarendon Press, p.269.
[47] Huber, V. (2006, June). The Unification of the Globe by Disease? The International Sanitary Conferences on Cholera, 1851-1894. *The Historical Journal*, 49(2), p. 466.

1.2.4 Health Magistrates

By considering how diseases were perceived in the past, it is possible to define the institutional bodies created to cope and prevent epidemic diseases. An approach to combat and prevent them was set up through a system of lazarettos, discussed in chapter 2. When illnesses were considered contagious, be it by touch or by the presence of miasma attached to goods, health policies were implemented to prevent them from spreading freely. For example, the plague in Europe induced the development of various public institutions during the 14th century that can be generally addressed as health authorities.

Public health was managed by local health institutions such as the numerous broads of health established in cities and countries and by state power. To this end, states and health magistrates' power usually experienced an increased role and influence in dealing with epidemics during emergency crises. For example, they could enforce sanitary cordons in entire cities or regions and destroy the possessions of private citizens that were thought to spread diseases. Such exceptional power was usually executed using the military, and as in the case of sanitary cordons, extensive military force was used to isolate entire regions.

Italian states were among the first to establish health authorities. For example, the Republic of Venice, being one of the leading carriers of goods coming from the Levant, mainly from Syria and Egypt, was more exposed to visitations of the plague. Numerous plague epidemics followed since the Black Death, and temporary health institutions were established. Yet, health authorities had limited tools at their disposal: usually, they were in charge of shutting down urban districts and homes through often violent methods of medical police, but ultimately, they allowed certain preventive strategies (Marchini, 2011).

Eventually, health authorities became permanent following the intensifying of commerce and the recurrence of outbreaks. In this regard, the Venetian Senate instituted on 7 January 1485 the Magistracy of Health and a stable 3-man committee ("*Provveditori alla Sanità*") to be renewed and elected annually. As the plague seemed to disappear, the committee was not renewed. However, the plague returned, and the Senate finally resumed the Health Magistracy, making it a permanent institution in 1489, which was later renewed and expanded. Noteworthy, by being an internationally widespread institution by the 16th century, permanent health authorities allowed a certain degree of sanitary cooperation among states.

1.3 HISTORICAL INTRODUCTION TO THE EXCHANGE OF INFECTIOUS DISEASES

1.3.1 THE GLOBAL SPREAD OF DISEASES: 14TH - 19TH CENTURY

The growing international trade between Europe and Asia during the 14th century provides a clear example of the impact of a globally interconnected world on people's health. To understand how states and cities started to exchange information and developed the idea of cooperating internationally, an event that dramatically changed Europe's economic, political, and cultural factors must be first addressed: the spread of the plague. It is unrealistic to identify how the disease entered Europe with absolute certainty. The plague was likely brought to Mediterranean ports in ships carrying rats arriving from the Black Sea, where the disease moved from east to west following merchants or armies, or a combination of those. A different thesis suggests that the disease followed rats' colonies that naturally and slowly moved northward from present-day Kurdistan and Iraq, reaching Southern Russia and then Europe (Norris, 1977).

The plague is most commonly transmitted to humans by the bite of an infected flea, transferring the bacteria *Yersinia pestis*. Fleas find their perfect habitat in the rat's fur, and only when rats are not available anymore, fleas adapt and are forced to change their host. During the 14th century, about half the European population perished because of the Black Death (Benedictow, 2006). First, it likely hit the Italian Peninsula and then the rest of the European continent. In the memories of 14th-century people, the plague was an unprecedented calamity. Once the illness arrived, it became endemic in Europe until the 17th century. It had such psychological effects that it was one of the primary diseases linked to creating an information network among cities and states.

Eventually, infectious diseases increased their global presence following the great geographical discoveries. Europeans delivered various diseases prevalent in Europe into the Western Hemisphere, such as measles, influenza, dysentery, mumps, and smallpox. When Spaniards reached the island of Hispaniola (the present-day Dominican Republic and Haiti), the native population quickly got infected, most notably with smallpox. It was an infectious disease long known in Europe for which the Spaniard sailors had developed a certain degree of resistance. It did not take much for the illness to spread quickly into the rest of the American continent, causing the collapse of the indigenous population and facilitating colonists' conquest (Duffy 1951). Moreover, the mortality rates suffered by the indigenous population strengthened the belief that Europeans enjoyed divine favour. A similar fate was shared by the native people of Siberia, decimated by smallpox brought by Russian forces hunting for furs and looking for new lands (Richards 2003).

A possible infectious disease passed from the American native population to European explorers is syphilis. However, the scientific community still debates the origin of syphilis. It is unclear whether it was endemic in the American continent and then subsequently imported into the Old World or existed already in Eurasia (Tampa et al., 2014). Nevertheless, the New World was the birthplace of some fatal plant diseases, such as *Phytophthora infestans,* the pathogen that triggered the Irish potato famines (Goss et al., 2014). Many Irish fled to the American continent to escape starvation, bringing several diseases, most notably cholera. Additionally, the insect *Dactylosphaera vitifoliae,* commonly referred to as Grape Phylloxera, caused a dramatic reduction in wine production in Europe (Meloni & Swinnen, 2016). Scholars debate whether it originated in North America or, as Gómez-Alpizar et al. (2007) suggest, in South America.

Human infectious diseases in the Western Hemisphere caused a demographic collapse. Europeans then introduced enslaved Africans into the continent to compensate for the local population loss. However, Africans proved to be effective vectors for malaria and yellow fever. Malaria was present in the Old World for millennia, and its birthplace can be found in the tropical area of Africa (Bruce-Chwatt & Zulueta, 1965) and Asia (Coatney et al., 1971). Malaria is caused by *Plasmodium* parasites spread by infected *Anopheles* mosquitos. It is debatable whether the disease was already present in the American continent before the arrival of Columbus. However, leading evidence suggests that malaria was introduced after contact with Europeans (De Castro & Singer, 2005). What is certain is that the growing African slave trade carried out by Europeans brought Africans infected with malaria into the New World (Schlagenhauf, 2004). While malaria caused significant mortality to native populations and Europeans alike, Africans suffered relatively less, showing increased resistance to the disease (Humphreys, 2001).

Additionally, yellow fever was an endemic disease in Africa that spread to the American continent in the 17th century by slave traders (Bryan et al., 2004). Through commerce, war, and civil unrest, yellow fever became a constant presence in the Western Hemisphere during the modern period and after. Due to the insurgency of outbreaks caused by enslaved Africans, a “seasoning” practice was set up in Caribbean islands to familiarise the enslaved people with a different environment like new climate and diet, and slavery practices (Mullin, 1992).

Arguably, the disease that attracted the most attention during the 19th century was cholera. Originally, cholera was known with different names and forms, as it also included common dysentery. Only what was usually referred to as “Asian cholera” is addressed in this document. The first pandemic of cholera originated in Bengal in 1817. Seven successive pandemics have been recorded, and the last one, which started in 1961, is still ongoing and primarily localised in low-income

countries. The causative agent is the bacteria *Vibrio cholerae*, which spread through water and food contaminated by faecal matters of an infected person.

As Hamlin (2009) suggests, what made cholera such a distinguished disease was the extent of reactions by society to it. The magnitude of its pandemic dimension was amplified by the increased commerce and movement of people, of which technological advancement, particularly the steam engine, played a crucial part. Interestingly, the spread of cholera in the Western world happened in a moment of significant economic, political, and scientific development. What is important is that so great was the reaction of people and governments to cholera that significantly contributed to the first attempts to establish a certain degree of sanitary cooperation by the mid-19th century through numerous sanitary conferences.

1.4 THE COLUMBIAN EXCHANGE: A FOCUS ON SMALLPOX

The term "Columbian Exchange" describes the transfer of people, cultures, flora, fauna, and diseases between the Old World and the American Continent. This chapter addresses one of the most unfortunate and dramatic consequences of this exchange: smallpox transmission from Europe to the American Continent. For this study, it is essential to introduce basic information about smallpox, its relationship with population loss, its role in European colonisers' conquest of the New World, and its potential use as a tool for biological warfare. Lastly, this chapter addresses the sanitary practices established to protect port cities through quarantine. Despite the high impact on the population, only poor sanitary cooperation was established until the first half of the 19th century. Among all the diseases brought by the Europeans to the New World during the 16th century, smallpox was the deadliest one for native populations.

Smallpox was a severe disease unique to humans caused by the *Variola* virus. There were two different varieties: *Variola major* and *Variola minor*. The deadliest variety was *Variola major,* which caused the most common form of the disease and had a case fatality ratio[48] of 5-40 per cent, while *Variola minor* had a case fatality ratio of 0.1-2 per cent (Fenner et al., 1988). Using Fenn's (2002) words, the relationship between smallpox and humans can be described as "paradoxical".[49] Indeed, when an individual contracts smallpox and survives, other than having possible permanent injuries such as skin scars or blindness, the individual also gets life-long immunity to the disease. In this way, the virus needs a constant source of new hosts that got never infected before to reproduce itself and survive.

1.4.1 ORIGINS

It is commonly agreed that the virus originated in early agricultural settlements in Africa or Asia around ten thousand years B.C., which were big enough to sustain a continuous chain of transmission from person to person (Hopkins, 1983). However, historical data of its first relevant outbreaks point out more recent times. One of the most critical pieces of evidence of what is believed to be smallpox can be found in a few mummies in Egypt, most notably the mummy of Ramses V, who died in 1157 B.C. Nonetheless, the accuracy of this theory is debatable because other diseases

[48] In epidemiology, the case fatality ratio refers to the proportion of people who die from a specified disease among all individuals diagnosed with the same disease over a certain period of time. Harrington, A. R. (2020). *Case fatality rate. Encyclopedia Britannica*. Retrieved August 12, 2021, from https://www.britannica.com/science/case-fatality-rate

[49] Fenn, E. A. (2002). *Pox Americana. The Great Smallpox Epidemic of 1775-82*. New York: Hill and Wang, p.13.

and not necessarily smallpox may have caused the skin lesions of Ramses V. In India, a possible description of smallpox can be traced as far back as 1500 B.C.[50]

More reliable evidence can be found in China, where smallpox was introduced around 250 B.C., likely imported from the Huns. Curiously, in China, the disease was referred to as "Hunpox", which reflects the long tendency to name diseases after foreigners, a tradition kept well alive even in nowadays societies. In Ancient Greece, Thucydides may have described smallpox in his account of the Plague of Athens. However, even if scholars disagree on the causes of such an outbreak, smallpox or typhoid fever were probably the responsible pathogens (Durack et al., 2000). What is certain is that Spaniards and the Portuguese were the main vectors of smallpox in Central and South America, while the British and French spread it in North America.

1.4.2 Demographic effects

The contact with the diseases brought by Europeans caused one of the most significant demographic collapses ever recorded. The size of the initial population of indigenous people in the American continent and its subsequent population loss is still currently debated by scholars. More agreement can be found in the example of the Arawaks living in Hispaniola. They were the first to contract the new diseases, as Spaniards docked their ships in Hispaniola during their first voyages. Before the arrival of the Europeans, the Arawak population was estimated to be 500.000 (Parker, 2010) or 1 million (Snowden, 2019). Despite the friendly encounter, Spaniards considered the island a strategic place to initiate their colonising process. As there is no evidence that the Spaniards willingly spread diseases to depopulate the island as a part of a plan to conquer it, it is safe to assume that it was a natural biological transfer of mainly smallpox and measles. Both authors commonly agree that the Arawak population experienced a dramatic die-off which eventually brought them to the brink of extinction in less than thirty years. Similarly, the people of Central and South American empires were halved by the 17th century (Parker, 2010) by virgin soil epidemics.[51] Tribes of Indians sparsely living in North America were destroyed as well, even though depopulation was not as fast as in the more densely populated areas of the Aztec, Maya and Inca.

[50] Description of smallpox can be found in the Sushruta Samhita, an ancient Sanskrit text on medicine and surgery. It was written slightly before 400 A.D., and it describes notions and practices used in 1500 B.C. Hopkins, D. R. (2002). *The Greatest Killer. Smallpox in History.* Chicago and London: The University of Chicago Press, p.16.

[51] Virgin soils epidemics are defined as: "[…] those in which the populations at risk have had no previous contact with the diseases that strike them and are therefore immunologically almost defenseless" Crosby, A. W. (1976, April). *Virgin Soil Epidemics as a Factor in the Aboriginal Depopulation in America*. (O. I. Culture, Ed.) The William and Mary Quarterly, 33(2), pp. 289.

In the Old World, during the 17th and 18th centuries, smallpox was one of the leading causes of death. However, in general terms, the population never stopped increasing. The Bills of Mortality of London provides one of the most accurate sources of information. In the following graphics (Fig.1-4), it is possible to see the population of London (Fig.1) and the annual deaths caused by smallpox for 269 years (Fig.2). It is important to note two sanitary milestones. In 1752, when an epidemic of smallpox struck London, the practice of variolation gained momentum (Miller, 1956). Then, vaccination became more common starting from the early 19th century, and by 1840 it replaced variolation (Riedel 2005). Over time, vaccination contributed to diminishing the incidence of the disease despite the increase of the population and higher urbanisation. It is possible to estimate that smallpox accounted for about 3% of all deaths in London during a period of 296 years, from 1661 to 1930 (Fig.3). When considering the period of higher incidence of the disease between 1731-1765, it accounted for about 9% of all deaths in London (Fig.4).

FIGURES 1-4 ARE SELF-PRODUCED GRAPHICS BASED ON DATA EXTRACTED FROM RYLOVA & EARN (2020).

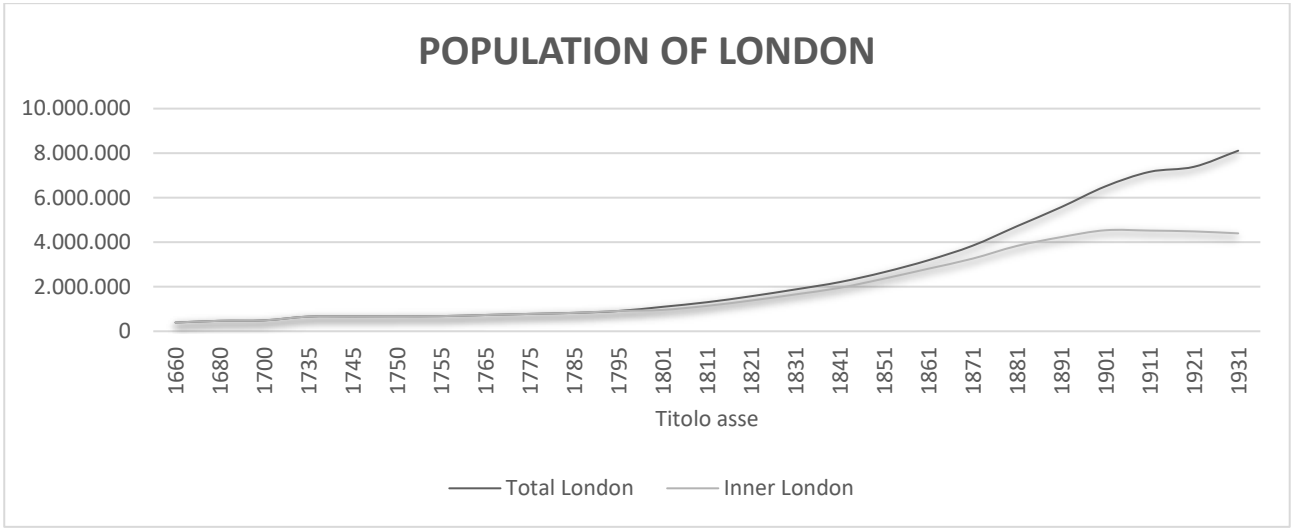


FIGURE 1: POPULATION OF INNER LONDON AND OUTER LONDON COMBINED FROM 1660 TO 1931.

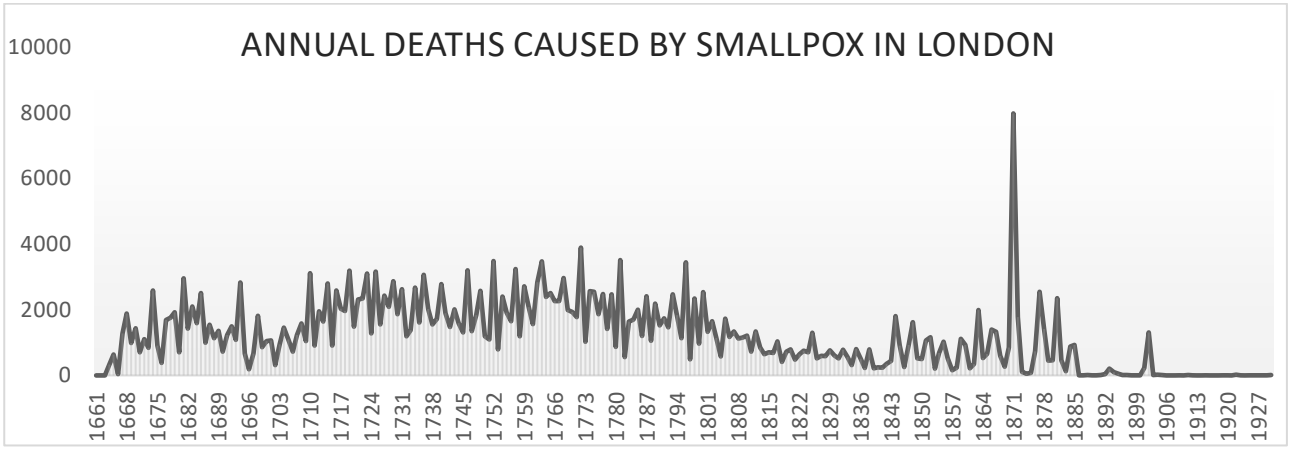


FIGURE 2: ANNUAL DEATHS CAUSED BY SMALLPOX FROM 1661 TO 1930.

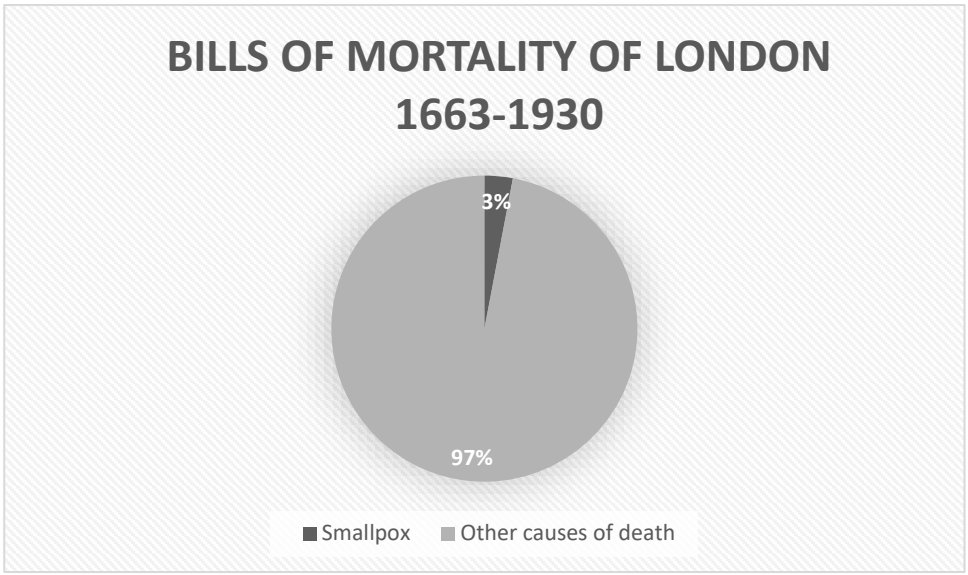


FIGURE 3: DEATHS CAUSED BY SMALLPOX COMPARED TO ALL OTHER CAUSES OF DEATH FROM 1663 TO 1930.

FIGURE 4: DEATHS CAUSED BY SMALLPOX COMPARED TO ALL OTHER CAUSES OF DEATH FROM 1731 TO 1765.

1.4.3 European settlers and indigenous people

By being such a widespread disease in Europe, many individuals contracted it during their first years of childhood, and therefore they acquired a life-long immunity to smallpox. Despite that, European settlers suffered from smallpox and other diseases to a great extent. Moreover, European colonists found harsh living conditions in the colonies and during the long voyage. The journey lasted on average from eight to fourteen weeks or more, depending on wind conditions. It is safe to argue that vessels had a long history of being carriers of diseases as they were overcrowded, with poor hygiene standards and low-quality food and accommodation.

A German migrant, who unsuccessfully tried to deter his co-nationals from departing to North America, described the "terrible misery"[52] onboard ships. That was unsurprising, given that migrants and sailors were usually poor and of low social status (Edwards, 1992). Once they arrived at the colonies, settlers had to deal with a lack of food and poor housing conditions, creating fertile soil for diseases to flourish. Additionally, inadequate nutrition leads to common diseases such as scurvy that weaken the body, making the individual more susceptible to various diseases.

While smallpox and other illnesses were well present in Europeans lives, they were not common among indigenous people. However, recent studies debate whether the less-lethal *Variola minor* circulated in South America before the arrival of the Europeans (Li & et al., 2007). The lack of written records of pre-Columbian societies and the little evidence left by skeleton remains of native people does not allow an accurate assessment of to what extent pre-Columbian populations suffered from infectious diseases. McNeil (1976) provided a helpful explanation of the reasons for indigenous' weakness to diseases.

The author argued that the New World possessed far less developed life forms than the more ecologically complex Old World. Similarly to humans, mammals such as cattle, swine, and horses can be vectors of diseases and have Old World origins. However, in the Americas, animals such as the alpaca and the llama lived dispersed in the mountains; thus, they were less likely to induce an animal to animal contagion and human spillover. Diseases flourish in settlements densely populated, and pre-Columbian societies in Central and South America developed big urban centres comparable to European and Asian cities. Yet, infectious diseases did not originate in the way they did in Eurasia and Africa.

[52] Mittelberger, G. (1863). *Journey to Pennsylvania in the Year 1750 and Return to Germany in the Year 1754*. (T. C. Eben, Trans.) Philadelphia: John Joseph McCevy. p.20. (Original work published in 1756)

In the free trade of diseases of the Columbian Exchange, there was virtually no sanitary cooperation among European colonizers and the native population. Even though Europeans largely understood the contagiousness of smallpox and the devastating effects on the native population, no sanitary precautions were usually taken. That is unsurprising, given that smallpox was not subjected to quarantine or other special measures in Europe during much of the Early Modern Period. Native people themselves did not establish any precautional measures, as the lack of serious infectious diseases before the arrival of Europeans did not create the necessity of developing any significant precautions.

Furthermore, diseases were likely the most powerful tool for conquest, even if they were used unwittingly by Europeans most of the time. Modern weaponry such as guns undoubtedly allowed colonisers an upper hand during battles against native populations. However, such a relatively easy conquest of a large territory would have been much harder to achieve had diseases not caused a dramatic demographic loss among natives. Moreover, Britain and France were at war in North America competing for precious land, and their continuous battles favoured contacts and conditions that facilitated the spread of diseases among Europeans and the natives.

For example, it is reasonable to think that the tribe of the Ojibwe, generally referred to as Chippewas, which used to live in the northern part of Lake Superior, was unaware of smallpox until about 1750. Their first encounter with the disease likely happened because they assisted the French in a war effort against the British and contracted the virus. Eventually, the disease spread among the members of the tribe upon their return. On a similar note, after the infamous siege of Fort William Henry in 1758, where about two thousand Indians were involved,[53] several were reported to be infected on their way home. Following the narrative provided by Heagerty (1928a), the French general Louis Joseph de Montcalm captured the site and displaced some of the war prisoners infected with smallpox to Halifax, back then a city under British control serving as an important military naval base, to create a smallpox outbreak. However, the plan failed as most of the prisoners recovered while most French transporting them by ship died.

It is also important to note that many Indian tribes were in close contact because of trade and war. Moreover, social events that included "dancing, gambling, sharing information and sexual encounters"[54] with different tribes and Europeans alike occurred in trading locations to form friendly relationships. Henceforth, it is reasonable to assume that such practices increased the chances for

[53] The siege of Fort William Henry ended with the victory of the coalition of more than 6.000 French soldiers allied with around 1.800-2.000 Indians from different tribes against a smaller army of British soldiers. After the British withdrew from the fort, the Indians violated the terms of withdrawal and massacred the fleeing British civilians and soldiers.
[54] Potter, G.D.; Hanson, James A., *Museum of the fur trade*, volume 42, number 2, summer 2006, p.21.

smallpox to spread even further into the mainland. As the narration of Thwaites (1896a) points out, some of the "Savages"[55] while trading with the Abenakis[56] contracted smallpox. They carried the disease to the village of Sillery (incorporated by present-day Quebec), which was the first reserve for indigenous people created by Europeans. It mainly served for the Jesuits to convert the natives to Catholicism. However, the Jesuit project in Sillery proved unsuccessful as indigenous people left the place after about forty years from its establishment due to recurrent epidemics, alcoholism, and low agricultural productivity. Overall, European missionaries, especially the Jesuits, found in native people what can be defined as "raw material"[57] to model indigenous' society according to Christian religious beliefs.

Eventually, Indians became suspicious of the missionaries. Many natives who had close contact with the Jesuits contracted smallpox and other diseases to a greater extent than those who had more limited encounters. The more the missionaries interacted with locals, the more diseases spread and ravaged indigenous villages. Jesuits themselves acknowledged a link between their presence and the spread of smallpox among natives. Jesuit Father Le Jeune wrote that missionaries "observed with some sort of reason that since our arrival in these lands those who had been nearest to us happened to be the most ruined by the disease and that whole villages of those who had received us now appeared utterly exterminated".[58] Native people's suspicions were reinforced because the Jesuits used to be near the dying Indians and assisted them in their final stage, yet they were almost untouched by smallpox. Some tribes thought that the Jesuits were poisoning them and violently expelled them from their villages.

Indian's suspicion related to smallpox and its use as poison can be found once again within the tribe of the Ojibwe. Heagerty (1928a) provides a fascinating insight into such a belief. The Chippewas were persuaded to pay with furs to amend their actions following the killing and robbery of a local trader. The directors of the fur company at Mackinac gave them gifts, mainly alcohol bottles and a folded flag. The Indians were instructed to unfold the flag once they returned home, where they drank, partied, and unfolded the flag. Shortly after, many of them fell ill with smallpox. The disease then spread in neighbouring villages, and there was a firm belief that the illness had been given to them

[55] Thwaites, R. G. (1896a). *The Jesuit relations and allied documents. Travels and Explorations of the Jesuit Missionaries in New France 1610-1791* (Vol. 16). Cleveland: The Burrows Brothers, p.101.
[56] A group of the Algonquian (also spelled differently: Algonkin) tribes that used to speak the Algonquin language or related dialects. They were the first tribes of native people that the British settlers encountered. The Abenakis allied with other tribes (the Souriqois and the Malacites) to fight against the English colonizers. Thwaites, R. G. (1896b). *The Jesuit relations and allied documents*. (Vol. 12), p.274.
[57] Ronda, J. P. (1972, September). *The European Indian: Jesuit Civilization Planning in New France*. Church History, 41(3), p.385.
[58] Father Le Jeune's Relation, as cited by Heagerty, J. J. (1928a). *Four centuries of medical history in Canada and a sketch of the medical history of Newfoundland* (Vol. 1). Toronto: The Macmillan Company of Canada Limited, p.66.

through the gifts. However, Heagerty (1928a) also provides a different explanation of how the natives may have contracted the virus. He reports that the natives attacked and looted a European settlement where smallpox was present, thus contracting the disease and spreading it among numerous tribes.

1.4.4 Biological warfare

Smallpox may have been used as a tool for biological warfare. For example, the British were accused of infecting the Indians with smallpox using gifts during what was referred to as the smallpox blanket incident in 1763. Numerous tribes[59] joined forces to attack the British, which eventually led to Fort Pitt's siege, located in Pittsburgh. British soldiers and merchants sought refuge and overcrowded the fort. Soon after, a cluster of smallpox broke out inside the place, and a temporary hospital was set up. Eventually, the Indians unsuccessfully tried to persuade the English to leave, and during the negotiation, as per their custom, they asked for gifts.

A British trader named William Trent acknowledged that the British deliberately attempted to infect the natives with smallpox. In his diary, he noted that "We gave them two blankets and a handkerchief out of the Smallpox Hospital. I hope it will have the desired effect."[60] However, it is debatable who conceived the plan. Fenn (2000) reported that there had been letter correspondence between Bouquet, a military officer inside the fort, and Amherst, a higher-ranking official based in New York. Together, they agreed on using smallpox against the Indians to win the siege. However, the plan had already been carried out before reaching such an agreement. It is also debatable whether the plan worked or not. According to Ranlet (2000), the plan did not work as the blankets likely failed to deliver the smallpox virus alive to the Indians.

The author argues that the Indians were already infected with smallpox. Diseases such as smallpox, measles, dysentery, and possibly flu were present in Pittsburgh up to four years before the siege; hence it is plausible that the natives contracted the virus by different means rather than such blankets. Trent himself did not mention the outcome of the scheme in his diary, which cast further doubts, as a successful outcome was likely to have been dutifully mentioned. What is certain is that smallpox struck the Indians outside the fort, causing severe casualties. Even though the plan's effectiveness is debatable, the "blanket incident" is evidence that the use of smallpox as a tool of war

[59] The tribes that attacked Fort Pitt in 1763 were the Delaware, Shawnee, and Mingo.
[60] Volwiler, A. T. (1924, December). *William Trent's Journal at Fort Pitt, 1763*. The Mississippi Valley Historical Review, 11(3), p.400.

had been considered and probably used. Henceforth, it raises the interest in other possible situations of smallpox being used intentionally for military purposes.

Due to its nature, the virus spread in most cases through coughing and sneezing of the infected person rather than with pustules contained in blankets or clothes, as they may dry and lose their viral load following prolonged exposure to the air. However, infected clothes and blankets could still transmit the virus. Historical records are incredibly scarce regarding the use of biological warfare. Despite the short information on the subject, it is possible to assume that smallpox was also used against non-indigenous people. In a letter from George Washington to John Hancock on 4 December 1775, Washington suspected that the British were intentionally inoculating refugees leaving the besieged city of Boston "with the design of spreading smallpox thro' this country and camp".[61] A confirmation of the suspicion can be found in the letter from Robert H. Harrison to James Otis on 3 December 1775, in which he claims that he was informed by English deserters that people were being inoculated "with design, probably, to spread the infection, in order to distress us as much as possible".[62] Despite some sanitary precautions like the isolation of infected people and their possessions being "sufficiently smoked",[63] an outbreak of smallpox occurred inside Boston, infecting troops and civilians alike.

Similarly, the intentional spreading of smallpox through variolization may also be attributed to Guy Carleton, a British general. He was accused of "inoculating the poor people at government expense for the purpose of giving it to our army".[64] Successful or failed attempts to use smallpox as a war tool show that the contagion nature of smallpox was well known and that it could be exploited. People realised that when an individual was infected with smallpox, easily distinguishable by its characteristic skin rash, and had close contact with other individuals, the disease usually spread fast enough to clear any doubts of its contagious nature. It must be noted that 18th-century people could not know that a virus was the causative agent of smallpox or other diseases, as the first virus was discovered by the late 19th century. One could argue that such episodes may have been influenced by

[61] Chase, P. D. (1987). *From George Washington to John Hanckick, 4 December 1775*. [Original source: The Papers of George Washington, Revolutionary War Series, vol. 2, 16 September 1775–31 December 1775, ed. Philander D. Chase. Charlottesville: University Press of Virginia, 1987, pp. 483–487.] Retrieved 08 05, 2021, from Founders Online: https://founders.archives.gov/documents/Washington/03-02-02-0437

[62] Ibid, note 11.

[63] Chase, P. D. (1987). *To George Washington from William Sever*, 11 December 1775. [Original source: The Papers of George Washington, Revolutionary War Series, vol. 2, 16 September 1775–31 December 1775, ed. Philander D. Chase. Charlottesville: University Press of Virginia, 1987, pp. 535–536.] Retrieved August 8, 2021, from Founders Online: https://founders.archives.gov/documents/Washington/03-02-02-0489

[64] Boyd, J. P. (1950). *Notes of Witnesses' Testimony concerning the Canadian Campaign, 1–27 July 1776*. [Original source: The Papers of Thomas Jefferson, vol. 1, 1760–1776, ed. Julian P. Boyd. Princeton: Princeton University Press, 1950, pp. 433–454.] Retrieved August 8, 2021, from Founders Online: https://founders.archives.gov/documents/Jefferson/01-01-02-0177

the advancement of the germ theory, which experienced significant breakthroughs in the observation of microorganisms by the 17th century, but it was not embraced until the 19th century.

1.4.5 Maritime quarantine

In the New World, sanitary precautions were put in place with similar methods used in Europe, establishing quarantine stations and specifically designated hospitals for infected people. However, the historical period in which a network of lazarettos was established differs from Europe. While maritime and land defence from diseases was well established in the Mediterranean already in the 15th century, it was certainly not the case in the American continent due to its later discovery — and contamination — by Europeans. In addition, it is worth noting that the flow of people coming to the American continent remained exceptionally high throughout the 19th century due to immigrants arriving from European countries. While most quarantine stations found new uses or were abandoned in Europe, they remained in use in the American continent.

By understanding the contagious nature of smallpox and other diseases, isolation became a standard method for containing outbreaks. By land, the isolation of people was more difficult to implement than quarantine for diseases coming by sea and people who contracted infectious diseases were usually confined in their private homes or sent to pest houses. It is important to note that isolation was well established with the increasing popularity of variolation and its consequent risks.

On the contrary, maritime quarantine was a standard method as most diseases were imported from abroad until they became endemic in the American continent. One of the first examples of maritime quarantine can be found in Boston, the most important commercial port. Imported diseases were more prominent in coastal areas, and the earliest quarantine practices in Boston can be traced as far back as 1647. There, quarantine was implemented mainly against the plague for incoming vessels from the West Indies, especially from Barbados (Williams, 1951) and against smallpox. A permanent quarantine station was set up in Boston in Rainford's Island years after the disastrous quarantine of a vessel infected with smallpox which arrived in the city's harbour in 1677. There, local people boarded the quarantined ship, contracted smallpox, and the virus consequently spread in the city and Massachusetts at large, causing nearly a thousand deaths (Sweetser, 1882). At that time, instead of having a permanent health institution such as the health magistrates typical of the Italian states in the Mediterranean, the keeper of the nearby lighthouse and certain army leaders were in charge of redirecting vessels suspected of carrying contagious diseases to the quarantine station. By 1737, the

city of Boston bought the island and built a hospital for quarantined people. Eventually, the first U.S. Board of Health was established in Boston in 1799.

Following Boston's example, the General Assemblies implemented quarantine rules in most of the colonies. However, a solid and stable public institution that would assert its leadership in quarantine practices has been missing for a long time in the region, contrary to many Mediterranean states. In this regard, Tandy (1923) considered quarantine practices to have been subjected to a "vague"[65] authority for an extended period, and evidence of this can be found with the example of the Board of Selectmen of Massachusetts, which was the most prominent authority regarding quarantine practices, maintained control over political power until the last decades of the 17th century and early 18th century (Lockridge & Kreider, 1966). By the last decade of the 18th century, some of the colonies established a new professional figure to help prevent imported diseases by ships: the port physician or health officer.

The health officer would provide medical expertise to support local authorities in dealing with diseases and advising them on implementing quarantine practices. The first health official was likely appointed in 1712 in the port city of Charleston, in the colony of South Carolina. By 1698, South Carolina adopted quarantine policies for ships coming from abroad, and in 1712 they were refined. Noteworthy, the diseases considered infectious and that consequently triggered quarantine measures and that were included in South Carolina' legislation were most notably the plague, smallpox, spotted fever and likely yellow fever. Yet, the most prominent disease in the region was malaria due to its swampy environment (Wood, 1999). Still, its contagious nature through mosquitoes was not understood until the closing of the 19th century, and until then, the disease was deeply linked with the miasmatic theory, as the name itself suggests.[66] On the contrary, smallpox had the most significant psychological impact on the general population of North America (Watson, 2013).

According to local law, a commissioner was appointed "for enquiring into the state of health"[67] of people and incoming ships. The General Assembly consented that the commissioner had the power to go onboard the vessels as soon as they entered the port and assess the sanitary situation of ships and crew. For example, the commissioner would investigate the causes of the death of former crew members during the voyage, and the health of places visited during the trip. Commissioners could also inspect the ship and crew members to assess sanitary conditions. Supposedly infected individuals

[65] Tandy, E. C. (1923). Local quarantine and inoculation for smallpox in the American colonies (1620-1775*). American journal of public health*, *13(*3), p.204.
[66] The term "malaria" derives from the Italian "*mala aria*", which literally means "bad air".
[67] Act No. 317 of 1712, "*An Act for the more effectual preventing the spreading of contagious distempers*." Cooper, T., & McCord, D. J. (1837). The Statutes at Large of South Carolina (Vol. 2). Printed by A.S. Johnston, p.382.

were sent to the “pest house”, and their belongings on the ship were cleansed. Upon leaving the pest house, a certificate proving the good health status was issued by the commissioner. Generally, when no supposedly infectious diseases were found in incoming ships, the average quarantine period was twelve days among the colonies. Worthy of notice is that local governments commonly agreed on the usefulness of the practice (Goldfield, 1976). Overall, other similar maritime sanitary measures used in the Mediterranean were adopted in the American continent, such as the extensive use of the bills of health.

It is crucial to notice that ships carrying enslaved people had to quarantine due to the considerable slave trade and the fear of diseases imported from Africa. Vessels that were found to bring infected people were subjected to a quarantine period of twenty days in South Carolina. To help enforce sanitary practices and presumably prevent the quarantine fiasco that happened in Boston years before, individuals who would illegally go onboard a ship whose entry was not yet approved by the commissioner were subjected to pay large sums of money. A lawbreaker with no means to pay and who was not a freeholder or a “reputable housekeeper”[68] like servants and “inferior people”[69] was subjected to public whipping. Eventually, in 1722 quarantine policies were implemented by Virginia and in 1751 by North Carolina and in the other colonies.

[68] Ibid, p. 383.
[69] Ibid.

CHAPTER 2 THE ORIGINS OF THE INTERNATIONAL SANITARY COOPERATION

INTRODUCTION

This chapter investigates the desire for international collaboration among European powers until the first half of the 20th century. To this end, it explores the long and troubled process of creating an international sanitary framework to improve cooperation. Arguably, the origins of the idea that increased international cooperation would prove beneficial for the economic interests of states lies in the Early Modern Period. It was evident to many political leaders and economic actors such as the merchant class that disease prevention practices profoundly limited international trade, thus reducing their profit margin. Therefore, more cohesion in responding to diseases was desirable.

This chapter starts its investigation by introducing the system of information networks of the Early Modern Period, which often proved to be a powerful tool for exchanging information about diseases, allowing states to set prevention measures and establish a network of international cooperation. However, states also used information networks to compete by spreading what would be now commonly referred to as "fake news". Then, the case of the Republic of Venice, as the leading power in the Mediterranean Sea, is addressed. Due to its importance in creating long-lasting and internationally recognised disease prevention practices and their usage within the Mediterranean region, the Republic of Venice provides a valuable case study. Preventive measures were mainly addressed against the plague, the most significant and disruptive disease that accompanied maritime and land trade for centuries. Thus, various countries collaborated, albeit limitedly, to preserve their public health and economies. In this regard, quarantine was the most common technique to prevent diseases, yet often it was used, to a certain extent, for political reasons as an instrument of foreign policy.

One of the most significant diseases of the modern period was smallpox, which triggered interesting forms of international cooperation that deserve to be addressed. To this end, this study considers the almost global reaction to overcome smallpox's adverse effects through specifically designed vaccination campaigns and expeditions. Thus, special attention is given to the Spanish and British international vaccination campaigns, the vaccine's introduction in the U.S. and its distribution among Indians, despite the conflictual relationship between the American government and the natives. Finally, it addresses the distribution of the vaccine in Napoleonic Italy.

Noteworthy, by the first half of the 19th century, cholera entered Europe and quickly became one of the most discussed diseases in international sanitary affairs. Due to the emergence of cholera and the apparent simultaneous retreat of the plague, several Mediterranean powers advocated for reforming the quarantine system and its legislation, which differed considerably from state to state, to make it less impacting on international commerce. The desire to change and reform the system increased exponentially during the first half of the 19th century. Arguably the mid-19th century was the most fruitful period for building the foundations of the long process to achieve a certain degree of international sanitary cooperation. During this period, the first International Sanitary Conference of Paris on 23 July 1851 proved to be a breakthrough for the evolution of such a process. Arguably, the 1851 Paris Conference can be considered a milestone in international sanitary cooperation even though its objectives were not reached. Finally, after a long series of international conferences and international treaties, the necessity to cooperate internationally in health matters culminated with the establishment of the World Health Organization.

2.1 INFORMATION NETWORKS AND THE ROLE OF FAKE NEWS

Since the Early Modern Period, many European countries have counted on a dense international information network system. Raymond & Moxham (2016) reported that the two most notable categories of information networks were diplomatic and postal. The former lies at the origin of the international network of news gathered and spread by consulates and embassies. The latter consisted of regional and international postal courier systems, rapidly evolving during the modern period. Additionally, given their international dimension, major urban centres and free ports were at the centre of such a network.

It is essential to have a well-established information network to establish, to a certain extent, international cooperation among different actors in sanitary matters. To this end, the spread of information enabled and shaped international cooperation and, as this chapter argues, also international competition among rival places. News shared information about diseases raging in nearby or faraway places so as to allow authorities to establish certain preventive measures. The consuls and health magistrates played a crucial role within the extensive information network of the modern period. In this regard, the consuls' role consisted of informing their governments of all internal relevant events of their host country, including epidemics, to the extent of being effectively considered part of an espionage network (Mèzin, 2006). Overall, the consular network allowed an efficient exchange of information from the peripheries to the central authorities.

One of the most significant examples of news connected with sanitary cooperation can be found in the Republic of Venice, which shared its health policies with foreign powers. Indeed, an international response was deemed more effective and created a more stable environment for commerce to flourish. For example, during the plague of 1721 in Marseille, the Dutch Consul asked the Republic of Venice for information regarding the organisation of its Health Magistrate. Venice's reply included a warning of trading with the Ottoman provinces because, there, the plague was "never extinct"[70] and that "commerce can never be safe with a country that, from time to time, is used to be infected",[71] stressing the need for rigorous sanitary measures Marchini (2011). The author finds it interesting that despite Holland being a direct competitor of Venice that contributed to its commercial decline, Venice instructed the Dutch with the requested information. In this regard, the share of information about clusters of plague with Venice's neighbours was part of a larger plan of preventing the spread of epidemics within the Serenissima's sphere of action as a monitoring and information

[70] Translated from Italian. Marchini, N.-E. (2011). *Venezia. La salute e la fede*. Vittorio Veneto: Dario De Bastiani, p.107
[71] Ibid.

centre. Henceforth, such an information network effectively included Venice's competitors and friendly states, framing the plague as an imported foreign disease that had to be stopped through a comprehensive and transnational approach.

However, the rumours of the presence of an epidemic disease like the plague had considerable negative economic repercussions. Most Mediterranean states banned the trade with infected or presumably infected places; thus, the status of good health was a prerequisite for a port or commercial town to maintain its trade. To this end, traders, travellers and ships' captains had to possess official documents, the bills of health, that stated whether the places they came from were affected by certain diseases. The Italian states can be considered the leading force in the widespread use of such documents. In the Mediterranean Sea, a dense consular network was in charge of issuing bills of health, most notably in port cities. As pointed out throughout this work, ships carrying a touched or foul bill of health were not admitted to free practice. However, it was not uncommon for captains to illegally discard foul bills of health to get new ones in non-infected ports.

It is important to note that Venice's health magistracy used a network of informants and spies to detect frauds. For example, Venice could count on undercover informants in charge of secretly providing information on the actual extent of the contagion on a given country, sent directly, and controlled by, the Health Magistracy. Often, such spies were outlaws that had to atone for their wrongdoings (Marchini, 2016). In this regard, it is helpful to understand the exchange of information among health authorities because, on the one hand, they allowed a certain degree of cooperation in harmonising practices. On the other, it allowed the spread of fake news to damage rival cities and ports.

The economic rivalry between the three free ports of Marseille, Genoa and Leghorn is fascinating. Free ports easily allowed foreigners to move there their business, thus creating a favourable environment for economic activities. Furthermore, their geographical position crossed by land and maritime trade routes allowed them to be part — and often the birthplace — of the exchange of information at the international level. Arguably, as a part of economic warfare, such ports effectively used false news about the presence of contagious diseases to damage their rivals. For example, the French consul in Leghorn, Alphonse de Moy, claimed that Genoa spread false news about the presence of an epidemic occurring in Leghorn with the sole scope of economically damaging it. In his letter, he affirmed that the Genoese sent letters to numerous Italian authorities warning of the potential risk of contagion coming from Leghorn because it allowed trade with Southern France during a plague outbreak and supposedly allowed some French vessels to unload goods during the night illegally. Yet, Tuscan authorities were notorious for taking strict precautions

to avoid such risks, even with non-susceptible goods. De Moy concluded that Genoa's fake news could be explained only by their "jealousy of commerce".[72] However, Genoese false news spread and the plan worked: harsh accusations against Leghorn were also followed by Venice, which did not miss its opportunity to take advantage of the situation. Eventually, Tuscan authorities had to stop trading with Southern France to avoid entering into a "sanitary war" with the Italian States and Spain. Still, they took commercial countermeasures against Genoa, such as higher import taxes and embargo on particular goods coupled with more strict quarantine (Filippini, 1998).

Likewise, in 1676 rumours of plague in Genoa spread to numerous countries. Calafat (2015) reports that the Genoese tried to contrast what they believed was false news spread fraudulently; thus, they stated that public health in the Republic was good. Yet, Genoa found itself economically isolated. Because of the news, Tuscan authorities blocked commerce with the Republic and enforced a sanitary cordon while Provence and Savoy took similar actions. Eventually, rumours reported that the plague reached Marseille. French authorities blamed Genoa for spreading unverified rumours, which accused Leghorn as the birthplace of such fake news. Similar episodes can be found in the rivalry between the Republic of Venice and the Republic of Ragusa. In the mid-17th century, the Ragusans opened a lazaretto in Ploče, significantly reducing the plague in the region. However, Venice persistently spread false news about the presence of plague within Ragusa's territory to disrupt its trade. On their part, Ragusans adopted strict laws to prevent the spread of false rumours. Evidence of that can be found in the execution of a local physician in 1675 that spread false information to Venetian authorities in Dalmatia about two merchants dying of plague in Dubrovnik (Bakija-Konsuo, 2018).

Information played a crucial role in fostering cooperative behaviours, and a significant degree of sanitary cooperation existed among Italian states. For example, on 24 June 1676, Cartagena authorities officially recognised the plague raging in the city (Martínez, 1951). Shortly after, news of the disease spread quickly, and by 7 July of the same year, Cotolendy informed authorities in Marseille of such an epidemic. The author suggests that the Italian states cooperated in tracking potentially infected British vessels, which were likely the cause of the infection in Spain. Eventually, an English vessel was quarantined in Leghorn after local authorities received information of the ship's trip to Cartagena by a merchant in Genoa. The British captain omitted the trip in the plague-infected city and tried unsuccessfully to deceive Tuscan authorities, which informed Venice about the sanitary fraud (Calafat, 2015). British vessels were commonly acknowledged to have a general disrespect of sanitary laws of foreign places. They were often responsible for inaccuracies and omissions in their

[72] Letter from Alphonse de Moy to the Marine Council, 6 March 1722, as cited by Filippini, J. P. (1998). *Il porto di Livorno e la Toscana (1676-1814)* (Vol. 2). Napoli: Edizioni scientifiche italiane, p.175.

bills of health and frequently lied over the nature of the transported goods. British negligence of sanitary rules often fuelled tensions with local health authorities, like the ones in Leghorn (Cipolla, 1992).

In Marseille in 1730, consuls quickly spread the news of the presumed presence of the plague within the city while local health authorities assured that much attention was given to sanitary policies and lamented the economic damages caused. Indeed, consuls often spread the news about diseases without verifying them beforehand, thus creating unjustified "bad publicity",[73] as Calafat (2015) claimed. The rapidity with which consuls were obliged to spread information allowed for a significant margin of error. Often, the consuls amended the news by sending official documents with additional information about the presumed presence of diseases weeks later their first announcement. Diplomatic communications regarding health matters were generally organised through different levels, from the least verified rumours and secret dispatches to the more reliable official declaration, as Petitjean (2013) reported. However, even secret missives often leaked out to the public. Overall, once the news was verified and the presence of plague or other diseases were confirmed, it is safe to assume that the consular network played a crucial role in fostering sanitary cooperation internationally.

For example, the Health Board in Marseille, being one of the most exposed ports due to its commerce with the Levant, by the 17th century could count on a dense consular information network in the Mediterranean and the Levant. Consuls systematically advised the health board on the sanitary situation of their respective countries and other public authorities that oversaw the commerce in the region. Since sanitary news could severely damage economic interests, it is unsurprising that such pieces of information were strictly controlled and kept secret by public authorities in some cases. By the end of the 17th-century, health authorities in Leghorn were aware of a potential epidemic happening in Sicily. Consequently, they took precautions in their port but did not publicity spread the news. However, the French consul François Cotolendy detected unusual sanitary measures against vessels coming from Sicily, and he then reported to French authorities the secret moves of the Tuscans so they could be prepared as well. Additionally, the consular correspondence between the health authorities in Tuscany and Marseille provides a practical example of sanitary cooperation. In this regard, the author reports that the health authority of Florence shared their information about

[73] Calafat G. (2015). La contagion des rumeurs. Information consulaire, santé et rivalité commerciale des ports francs (Livourne,Marseille et Gênes, 1670-1690). In S. Marzagalli, *Les consuls en Méditerranée: agents d'information (XVIe-XXe siècle)* (pp. 99-119). Paris, p.5.

potentially infected and contagious places in Germany and Spain, which were re-shared by the French consuls.

Overall, Health Magistrates were part of a more extensive information network that was not only limited to news about human diseases but also infectious animal diseases. For example, in the mid-18th century, an epidemic among cattle in Croatia triggered a share of news and reports between the Health Magistracies of Triste and Venice, which collected relevant information on the field and shared the findings also with their neighbours. It eventually followed a cattle trade ban with the infected region. Yet, in subsequent episodes, Venetian authorities cast doubts over the veracity of crucial information, like the official declaration of the disappearance of cattle's epidemics, likely made by the infected places to prevent further economic losses and restore commerce. Aware of that, Venice restored the trade ban (Delogu 2020).

The examples reported highlight the fundamental distrust among health authorities of different places. However, they also show the crucial role of the consuls and health authorities within the information network of the Mediterranean Sea that allowed an effective exchange of information on sanitary matters. Yet, such an extensive and interconnected information network simultaneously created grounds for unverified rumours to spread. The examples of Marseille, Genoa and Leghorn expose the double effects of news used for cooperation and competition between rival places and, as the example of Croatia supports, the tendency to conceal vital information to prevent foreign states from imposing trade bans.

2.2 SANITARY COOPERATION IN THE MEDITERRANEAN

2.2.1 THE EXAMPLE OF THE REPUBLIC OF VENICE

The plague's return in Europe during the 17th century was a tragic event and confirmed itself as the most feared disease. The plague never disappeared in Europe and had sporadic outbreaks during the 16th century, mostly limited to some urban areas. Among those outbreaks, one of the most affected cities was Venice.[74] In broader terms, the plague's return did not cause the same demographic disruption that occurred during the 14th century. Its reappearance in the 17th century had a local dimension, mostly limited to cities and towns across Europe and not whole countries alike. Yet, in some towns, mortality was incredibly high. In Milan, between 1629-1630, almost half of the population died.[75] In Venice, during 1630-1631, about one-third of the population was lost due to the plague.[76] On the contrary, the plague was still endemic with a considerable incidence in Eastern Europe, and it remained predominant in many provinces of the Ottoman Empire until the 19th century (Biraben, 1975).

Much of the sanitary regulations of the Early Modern Period were connected to the reappearance of the plague. In this regard, in many Mediterranean countries, commerce with infected — or supposedly infected — places was banned by local legislation. The Italian states and the Republic of Ragusa were the pioneers of many sanitary institutions and bureaucracies to prevent and manage disease outbreaks. Even though diseases' origins and spreading patterns were unclear, Italian states and the Ragusians set up permanent bureaucracies, such as quarantine stations and health magistratures. In this regard, the Republic of Venice covered a prominent role in fostering international cooperation. The Republic of Venice enjoyed a central position over the Mediterranean Sea, and so did its health policies dealing with epidemic diseases. Given Venice's geopolitical status, its health policies rapidly became an international reference model for other states.

[74] Between 1575 and 1577 Venice experienced an outbreak of plague. According to Del Panta (1980), from an initial population of 180,000 about 46,752 people died, resulting in a decrease of almost 26%.
[75] Before the plague outbreak in Milan there was a population of 130,000 of which 60.000 people died, resulting in a decrease of 46% (Del Panta, 1980). Another estimation is provided by Ripamonti (1841), with initial population in Milan of 150,000, approximately 86,000 died, resulting in a decrease of 57%.
[76] In Venice, from an initial population of 141,000 around 46,000 died, resulting in a decrease of 33% (Del Panta, 1980).

The Ambassador of the Serenissima Republic in Vienna, Francesco Donado,[77] stated that much of Europe and nearby states respected Venice's "prudent dictate".[78] Additionally, sanitary laws in Venice were praised by intellectuals, such as the wealthy merchant and economist Carlo A. Broggia, who, in the mid-18th century, claimed that the "good laws"[79] adopted by Venice to prevent the plague were "worthy of imitation".[80] Furthermore, the Secretary of the Supreme Council of Health in France, Pierre de Ségur-Dupeyron, in 1834 affirmed that Venice had the "immense honour"[81] to have laid "the basis of a system to which Europe, to a certain extent, owes its present-day population".[82]

While other states tried to emulate Venice's health policies, sanitary practices differed among states and ports. Arguably, the Health Magistracy in Venice played a prominent role in harmonising such rules, as it possessed a significant power capable of influencing commerce in the region. The Health Magistrature was in charge of deciding which sanitary measure should be used and which states, in its view, adopted the same disease prevention practices. Henceforth, it is possible to assume that the Health Magistracy promoted a sort of "Venetian standard", which had to be followed by all involved actors in order to take part in the prosperous commerce in the region. Therefore, when a ship was considered to pose a sanitary risk, a period of quarantine was imposed. The same applied to entire regions or ports suspected to be infected with diseases, and therefore, all trade activities would be banned and stopped.

Given Venice's geopolitical position, its influence went far beyond its borders. During the early 18th century, most of the main ports within the Mediterranean Sea adopted Venice's health policies. Many states used to harmonise sanitary practices to diminish the risk of importing epidemic diseases from maritime commerce and avoid the risk of being excluded from trade networks by Venetian authorities. Non-compliance with sanitary dispositions by Venice may have resulted in trade restrictions by other countries as well. Consequently, Mediterranean states were forced to comply to avoid being excessively penalised in their commercial activities. Furthermore, Venetian health

[77] Many variations of Francesco's surname exist. In this work "Donado" is spelt in the same way as reported by the authoritative Archivio di Stato di Venezia. (1959). *Dispacci degli ambasciatori al Senato: indice*. Roma.
[78] Archivio di Stato Veneziano, *Dispacci ambasciatori al Senato, Germania*, 28 October 1724, p.217. As cited by Andreozzi, D. (2009). "L'anima del commercio è la salute". Sanità, traffici, rischio e dominio sul mare in area alto adriatica (1700-1750). In C. N. Ricerche, & R. Salvemini (Ed.), *Istituzioni e traffici nel Mediterraneo tra età antica e crescita moderna*, p.227.
[79] Translated from Italian. Broggia, C. A. (1743). *Trattato dei tributi, delle monete e del governo politico della Sanità. Opera di stato e di commercio, di polizia e di finanza*. Napoli: Pietro Palombo, p.441.
[80] Translated from Italian. Ibid.
[81] Translated from French. Dupeyron, D. (1834). *Rapport adressé à son exc. le ministre du commerce, chargé de procéder à une enquête sur les divers régimes sanitaires de la Méditerranée.* Paris: Imprimerie Royale, p.18.
[82] Ibid.

policies were considered a "yardstick"[83] at the international level to measure the reliability of cities and ports in controlling epidemics.

Noteworthy, the importance of Venetian's risk perception was not limited to diseases, but it was inserted in a broader social and political discourse. Risk perception is part of a social process that various communities can frame differently, reflecting local economic, political, and cultural factors (Douglas & Wildavsky, 1983). The reason why political factors played an essential role in shaping Venice's and other states' sanitary policies can be linked to the lack of medical knowledge, to the necessity of finding a compromise on protecting public health and the country's economy, and to Venice's geopolitical relevance.

Undoubtedly, the dilemma of keeping the trade flowing while providing a satisfactory degree of protection from importable diseases was well known to Venetian authorities. To this end, as this chapter exposes, a compromise was found with the establishment of quarantine practices, lazarettos, and a widespread information network that would allow commerce to keep going, even if slowed down. Moreover, the difficulty of finding an equilibrium between economy and health was a long-standing issue in other maritime powers. During the late 16th century and the first years of the 17th century, the Reign of Naples provides a clear example. There, political and economic pressures strongly contributed to nullifying controls within the port, such as keeping track of incoming ships or imposing a quarantine on them. Notwithstanding, Naples shared many of Venice's sanitary practices, and more attention to sanitary controls was adopted due to the numerous plague outbreaks in the region,[84] starting from the early 17th century with the establishment of permanent bureaucracies and quarantine facilities (Nappi, 1980).

Sanitary policies were far from being an objective and neutral disease prevention tool. Political factors played a crucial role in shaping Venice's health policies. Arguably, health policies followed a mercantile logic, defending the interests of the Republic. It was up to Venetian authorities to determine which region, port, or vessel could be allowed to freely participate in trade activities — hence being admitted to free practice[85] — or if sanitary rules such as quarantine were to be imposed. In this regard, Milošević (2018) argues that Venetian quarantine practices "led to the discrimination

[83] Andreozzi, D. (2015). The «Barbican of Europe». The Plague of Split and the Strategy of Defence in the Adriatic Area between the Venetian Territories and the Ottoman Empire (Eighteenth Century). *Popolazione e Storia*, 16, p.118.
[84] For example, in 1624 there was an outbreak of plague in Palermo, in 1636 in Sardinia, in 1646 in Zante and in 1656 in Naples.
[85] "Free practice" refers to the permission given by port authorities to a vessel to freely disembark its crew and merchandises without the imposition of precautionary measures.

of ships and passengers from certain countries".[86] Indeed, ports considered to be a danger to public health would be temporarily banned from entering Venice's trade network. Yet, excluding a region from trading and allowing another to operate freely would determine the latter's prosperity and the former's demise.

Quarantine practices did not have a fixed time and could last between fourteen and forty days. Therefore, Venetian authorities could arbitrarily decide to favour one trading port over another according to specific political interests of the time. Notwithstanding, much of the sanitary cooperation in the Mediterranean resulted from the central position of Venice in the region.

However, by the first half of the 17th century, many Italian states suffered an economic decline that limited their international influence. The causes of this economic downturn are various, and they have been explored widely by historians. Undoubtedly, epidemic diseases, especially the plague, played their part in exacerbating that decline and reducing their exports. Italian states' exports were severely limited because of high production costs, which partially increased due to the loss of population caused by the plague. Indeed, wages are linked to the marginal product of labour (Clark, 2007), and according to classical economic theory, wages increase when the supply of labour decreases. For what it concerns Venice and many other Italian states during this period, they suffered a sharp population decline.[87]

By the end of the 17th century, Venice's hegemonic position in controlling maritime commerce in the Mediterranean declined.[88] Piracy was becoming a widespread issue for Venice's control over the sea, and pirates evaded all kinds of sanitary rules, boarding ships without any precautions. Simultaneously, smaller port cities increased their influence in the area, evading Venice's controls with numerous undetected small boats. Consequently, public health in the region was under threat. Moreover, another power was challenging Venice's authority in the region: the Austro-Hungarian empire, which intended to increase its maritime presence. However, Vienna often refused Venice's sanitary inspections on Austrian ships. For example, Vienna blocked the commerce between the Reign of Naples, which was under Vienna's rule, and Venice, as a retaliation for its sanitary intrusions, and more broadly, because of the competition between the two powers.

[86] Milošević, A. (2018). *Lazaretto in Dubrovnik: The Beginning of the Quarantine Regulation in Europe*. Dubrovnik. p.169.
[87] Cipolla., as cited by Del Panta (1980) estimated that slightly more than one-fourth of the population of Center-Northern Italy died in the two years plague outbreak. Out of a population of 4 million, 1,100,000 died. With a similar vigour, the plague hit Southern Italy during the epidemics of 1656-1657.
[88] Venice's power experienced a slow decline since the maritime rout in the Atlantic gained importance.

The hard case to assess the competitive environment in the Mediterranean, and the consequent risks to public health, can be found in 1720, during the explosion of the plague epidemic in Marseille. Venice temporarily banned trade with suspected plague-infected places and banned the recently Austrian-controlled Messina as well, considering local health policies to be insufficient. What is interesting is that, according to Messina's authorities, there were no signs of the disease within the city and that health measures were carried out regularly, underscoring the possibility that the trade ban was moved by economic and political factors rather than health reasons (Andreozzi, 2009). To what extent the accusations were moved for sanitary reasons or economic interests remains unclear. Yet, the Venetian trade ban created a domino effect with Naples' port. There, authorities blocked the port of Messina and all ports on the coast of the Reign of Two Sicilies, imposing quarantines for incoming ships (Salvemini, 2009). However, it is debatable whether they did so for fear of importable diseases or to avoid being suspended by Venice, as Andreozzi (2009) suggested.

Furthermore, the author reports that Venice threatened Austria to adopt Venetian sanitary rules, and non-compliance with such a request would result in a trade suspension with Austria's ruling states. The threat succeeded, and Austria intensified, albeit limitedly, its health policies. This highlights the fact that health policies in the Mediterranean were subjected to negotiations; therefore, health policies were not only a matter of health but also a matter of diplomacy.

Arguably, Venice's influence during the mid-18th century was much more limited and could not impose standardized sanitary rules. Sanitary practices were highly fragmented, as each power in the region used its sanitary practices that differed enormously. For example, Venice stuck with its well-established quarantine practices and lazarettos, while Naples lagged.[89] Furthermore, Naples was under opposite pressures. On the one hand, pressures from Venice advocated for the suspension of all ports considered dangerous. On the other hand, such a suspension would make clandestine practices more attractive, such as the undetected unloading of cargo and people by ships that feared to be unable to find a suitable port. Such clandestine methods may have posed considerable sanitary risks.

The increased competition in the region to monitor maritime trade and the consequent loss of sanitary control by Venice made the city lose its authoritative power, fragmenting the idea of standard practices even more. Each state proceeded with its autonomous methods with little regard to the health policies of its neighbours. Thus, it was a clear signal of the decline of Venice as a paladin of sanitary practices in the Mediterranean, with a consequent loss of the country's prestige. Consequently, the

[89] The original project for a quarantine station for people and cargo outside the port of Naples was idealized in 1593, but its realization was delayed, and the lazaretto was finished only in 1628.

entire mechanism aimed at defending Europe against the plague was falling apart. The core point of that mechanism relied on standard practices organized by Venice and subjected to its own will, and Mediterranean states relied significantly on the unipolar[90] region that Venice envisaged and fought to impose. Eventually, the Mediterranean area shifted toward a multipolar region, with numerous actors and little sanitary cooperation. Henceforth, with Venice's decline, international sanitary cooperation in the area became unsustainable.

The erosion of Venice's power became more apparent during the plague outbreak in Algiers in 1729. Venice suspended the ports of the Reign of Naples and the Papal States while the Austrians kept open their relations with them, which in turn caused the mutual suspension of imperial and Venetian ports. Ironically, competition among several states and Venice provoked, to a certain extent, cooperation among other powers to contrast Venice's decaying influence and to fill the void it left. Naples and the Papal States were cooperating internationally with the Austro-Hungarian empire to act together in sanitary matters with other ports, like the ones in Tuscany and the free port of Trieste, which were gaining importance. At the same time, Venice was willing to cooperate with the Empire to ensure that sanitary policies were taken by one actor and timely shared with the others. Simultaneously, Venice cooperation aimed to dissipate rumours about managing sanitary matters with interests different from health.

An agreement was finally reached, stating that Venice was in charge of deciding which sanitary policies were necessary. Those decisions were to be adopted in Imperial ports as well. Still, Venice had to explain the reasons that supported its choices to the Empire so that they could be examined and amended, if necessary. Such a different geopolitical environment was a breaking point about the rights that Venice had always claimed over the Mediterranean. This way, Venice was forced to share those rights with the Habsburgs to maintain a crucial position. Moreover, a similar agreement was discussed by Venice with the Papal States, signing a new period of international cooperation in sanitary matters in the multipolar Mediterranean, composed mainly of small states and ports. With Venice not controlling the region and its numerous sea routes, other actors gained relevance, among which the free port of Leghorn stood up because of its strict health policies.

[90] In this context, "unipolarity" refers to the overwhelming superiority enjoyed by the Republic of Venice in the Mediterranean Sea, making it a prominent actor capable of shaping the international environment according to its own benefits and interests, more than any other country can do.

2.2.2 THE INTERNATIONAL NETWORK OF LAZARETTOS AND THE BILLS OF HEALTH

Lazarettos were permanent facilities to prevent the spread of importable diseases, such as the plague. First established by the Republic of Venice, they soon became a vital and widespread institution, particularly along the coast of the Mediterranean Sea. States used lazarettos to protect themselves from diseases, mainly from the Levant, where the plague was endemic. The first lazarettos were usually intended as hospitals for people afflicted by the plague, where they would enter to be isolated and receive medical care during an outbreak. The first intended hospital for infected people was built in 1423 on the small island of Santa Maria di Nazareth in Venice, named *Lazzaretto Vecchio*. Soon after, in 1468, Venice built a second lazaretto, named *Lazzaretto Nuovo*, that served as a quarantine station for ships coming from places suspected of being infected with diseases. Eventually, also the first lazaretto was used as a quarantine station. Yet, the Republic of Ragusa can be considered the forerunner of quarantine regulations, as it implemented them as early as 1377 in Dubrovnik. Originally, quarantine in Dubrovnik was performed in small wooden barracks.

Lazarettos in Venice were perceived to be successful facilities, and they could hardly cope with the high number of people sent there to isolate: on average, seven to eight thousand people were located in the *Lazzaretto Vecchio* and ten thousand in the *Lazzaretto Nuovo* (Bondioli, 2018). Therefore, by 1793 a new, temporary facility was set up on the island of Poveglia to quarantine ships in case of emergency.[91] A valuable inside of the two lazarettos was provided by Howard (1791), where he performed his quarantine in 1785. At first, a room in the *Lazzaretto Nuovo* was assigned to him that he described to be a "very dirty room, full of vermin, and without table, chair or bed".[92] With the help of the British ambassador, Howard moved to the *Lazzaretto Vecchio*, in a four-room apartment where the rooms were "without furniture, very dirty, and no less offensive than the sick wards of the worst hospital".[93] Besides numerous flaws, like corruption that severely undermined the usefulness of quarantine, he concluded that Venetian preventive measures were "wise and good"[94] and that health policies' rules were an international model followed by other states.

Other important lazarettos were constructed in Bergamo as early as 1504 under Venice's pressures. In Verona, it was finished in 1628, two years before a significant outbreak of plague in the

[91] Temporary wooden barracks were set up in 1793 to quarantine a plague-infected Ottoman ship coming from Nafplio. Poveglia was used also in 1799 to quarantine a Spanish ship with plague on board and then in 1804 following the Austrian government's order to send to Venice Spanish ships suspected of carrying yellow fever. After that, the island was used as a quarantine station for ships against cholera.
[92] Howard, J. (1791). *An Account of the Principal Lazarettos in Europe.* London: J. Johnson, C. Dilly, and T. Cadell, p.11.
[93] Ibid.
[94] Ibid, p.22.

region. In Trieste, the first lazaretto was built in 1730 under the will of Austria. Eventually, by the 18th century, the most important ports in the European part of the Mediterranean could count on lazarettos, and some of them had more than one.[95] Surprisingly, the Kingdom of Spain lagged far behind its Italian counterparts[96], as it realized its first lazaretto in Mahón in 1796 but served as a quarantine station for ships only by 1817. After that, a more complex network of quarantine stations was established in Spain. Likewise, Naples could count only in a poor quarantine system. The original project for a lazaretto for people and cargo outside its port was idealized in 1593, but its realization was delayed, and the lazaretto was finished only in 1628. Howard (1791) considered it "very small"[97] and noted that insufficient attention was given to quarantined people and cargo alike.

Likewise, England lagged behind most Mediterranean states in terms of quarantine facilities. It was not until the passing of the quarantine proclamation by Queen Anne in November 1710 that England regulated and effectively established quarantine for incoming ships. The directive ordered that vessels coming from the Baltics — a region severely affected by the plague during the early decades of the 18th century — would be obligated to undergo a forty-day quarantine before unloading cargo and persons. However, no lazarettos would accommodate those ships, so they had to dock at a designated area and were under strict surveillance. However, quarantine-like policies were already practised locally in Scottish municipalities as early as the 15th century. For example, ships coming from Danzig — a city severely affected by diseases — were put in quarantine in 1564 by the Scottish municipality. In contrast to England, Scotland had considerably more maritime trade with the infected regions of the Baltics, which in turn, extensively traded with infected Ottoman provinces.

Shortly after the Queen's proclamation, the Parliament approved and passed the Quarantine Act of 1710. Later, the Act of Quarantine of 1721 replaced the former, tightening quarantine measures and penalties for the offenders.[98] However, the parliament approved the construction of a lazaretto only in 1800. Worthy of mention, in England, the bills of health were extensively used, and some foreign lazarettos were recognized. Accordingly, ships that underwent quarantine in a recognized lazaretto could have asked for permission from local public officials to unload the cargo with slight further delays if some conditions were met. For example, they must have carried a clean bill of health

[95] For example, Marseille possessed four lazarettos; Ancona, Dubrovnik, Trieste, and Venice had three, Rijeka two.
[96] Noteworthy, already during the last decades of the 18th century, a major shift in the Spanish sanitary maritime measures took place. During the reign of Carlos III, the necessity of setting in place an improved maritime quarantine system coincided with the opening of the Kingdom of Spain to pestiferous countries, like Algeria, with the peace treaty of 1785.
[97] Howard, J. (1791). *An Account of the Principal Lazarettos in Europe. London*: J. Johnson, C. Dilly, and T. Cadell, p.8.
[98] The more severe quarantine offences could lead to the death penalty. For example, illegally entering a quarantined ship to exchange goods and then trying to escape. The same applied for officials that allowed the entrance of goods and people coming from infected places. In Britain, death penalty for quarantine offences was finally abolished with the Quarantine Act of 1825.

and possessed non-dangerous merchandise. If they brought goods that potentially carried diseases, ships had to quarantine in a designated place and pay quarantine taxes. If the bill of health was not clean, quarantine taxes increased (Mullett, 1937).

Interestingly, even though England did not possess any lazaretto during the early 19th century, it could count on the well-established quarantine network of the Mediterranean states. Specifically, the lazarettos recognized by the Act of 1799 were in Ancona, Genoa, Leghorn, Malta, Marseille, Messina, and Venice. However, starting from 1755, England counted on specifically designated vessels to air the merchandise of ships coming from infected regions. In this regard, "two large hospital ships, commonly called lazarettos"[99] retrieved from dismissed war vessels were used exclusively for such a purpose. They were docked in the channel of Stangate Creek and were constantly guarded to prevent the crew from leaving before the end of quarantine.

In Europe, maritime powers allowed only a limited number of ports to accept ships coming from the Levant to reduce the risks of importing diseases. In the case of France, for example, according to the law published by the parliament in Provence on 1 January 1622, only the port of Marseille and Toulouse could receive ships from the Ottoman Empire (Estève, 1905 as cited by Panzac, 1986). For ships to have the right to trade within the available ports, they had to provide certificates stating they did not pose any sanitary risks or that they already underwent a period of quarantine in an authorized facility.

In this regard, bills of health and consular activities would play a central role in guaranteeing international commerce to flow. It is crucial to notice that, on the one hand, lazarettos allowed a mutually-recognized network of quarantine stations. On the other, they were also used to compete with rival ports. Ports that did not have any quarantine stations could not accept incoming ships from the Levant, and they would be excluded from trading with the Ottomans. Undoubtedly, lazarettos allowed for great economic returns, even if the facilities themselves were costly to maintain. The Republic of Genoa, for example, built the lazaretto of Varignano between 1724-1740 not only to protect the city of Genoa but also to compete economically with its rival neighbour Leghorn. The latter had one of the first modern lazarettos in Europe. Similarly, the free port of Ancona[100], ruled by the Papal States, by 1743 could count on a lazaretto intended to compete with other maritime powers, namely Venice (Panzac, 1986). In that way, competition among ports was not limited to trade but also to the quality of accommodation given to quarantined merchants. It is logical to assume that

[99] Hasted, E. (1789). *The History and Topographical Survey of the County of Kent*. Canterbury: W. Bristow, p.35.
[100] Pope Clement XII proclaimed Ancona free port on 14 February 1732.

merchants would prefer to isolate themselves in a more comfortable lazaretto than in an old, unsanitary place if given the possibility to choose.

In the American continent, similar facilities were established as well. As chapter 1.4.5 points out, in North America, quarantine stations were created during the mid-18th century. Similarly, quarantine stations based on the European lazarettos were established elsewhere in Central and South America. For example, scholars commonly agree that the plague reached South America in April 1899, imported by a ship carrying Indian rice via Rotterdam. Yet, the plague was still a feared disease and triggered initial preventive measures in the American continent. When it first arrived, the plague was not early identified; hence it had the time to spread in South America. It was not until the Argentinian government, in line with its counterpart in Paraguay, sent a team of experts was the disease recognized to be plague (Moll & O'Leary, 1940). This event highlights the importance of sanitary cooperation to provide early transnational medical expertise that allows the early detection of disease outbreaks.

As shown in the previous chapters, the Health Magistracies played a prominent role in contrasting the plague coming from the sea. The captain of incoming ships dealt with local health authorities, undergoing interviews with local officers in each port the ship docked. To this end, along the coast of the Mediterranean Sea, and especially in Venice's territories, following what is now commonly called "social distancing", the health officials asked basic questions regarding the ship. Information gathered during the interview was about the ship's name and nationality, the origin of the trip and relevant information about the captain, the crew and passengers over their health, people met during the journey, and, more importantly, any sanitary incidents.

Interestingly, as mentioned in chapter 1.2.3, letters and documents were believed to carry diseases, namely the plague, cholera, yellow fever, typhus and all the other diseases perceived to be pestilential. There were different methods for disinfecting letters. For example, in Leghorn, letters were dug into a solution made from vinegar. In Venice and Trieste, letters were commonly fumigated with herbs, and in Genoa, they were lightly burned with a flame. In Marseille, it was also used chlorine. Overall, disinfection of letters was common in other Mediterranean ports, such as Malte, Alexandria and Cairo. Worthy of mention, the sanitization of letters brought a significant degree of international cohesion. In this regard, Panzac, as cited by Dutau (2002), remarked that such defensive measure was so important that it led to an international collaboration that would not be interrupted, not even by wars or political revolutions. However, such practice posed several problems of text alteration, and it was also used to interfere with messages from rival states.

Eventually, the bills of health were introduced to allow a more connected and mutually recognized quarantine measure carried out in different lazarettos. A bill of health can be defined as a "document issued by the consul, or the public authorities of the port which a ship sails from, descriptive of the health of the port at the time of the vessel's clearance".[101] The bills of health were first issued in the 15th century. Eventually, thanks primarily to the advancement of the contagionist theory defended by Fracastorius during the mid-16th century in Venice, the health bills increased their importance (Biraben, 1976). Additionally, by the 16th century, their use became more common due to the increased consular presence of European countries in the Ottoman Empire. By the 17th, the bills of health became mandatory and such documents were considered vitally important. Evidence of that can also be assumed by the fact that ill-intentioned captains that would provide false reports on the health status of the ship to Venetian health magistrates could be sentenced to death.

The bill of health led sanitary authorities to decide the length and certain aspects of the quarantine imposed on the ship, its crew, passengers, and cargo. For this purpose, the bill of health could have been "clean", which indicated that there were no known cases of infectious diseases in the port nor a neighbouring place at the time of its issue. It could have also been "suspected" or "touched" if rumours that infectious diseases had appeared. However, this did not necessarily mean that infected people were officially reported. Thus, suspected/touched bills of health raised issues of being influenced by false news, and for this reason, they were widely discussed during the international sanitary conferences. Finally, the bills of health could have been "foul", indicating that the ship departed from a place infected with a pestilential disease. Thereby, a ship carrying a "foul" bill of health would be barred from specific ports and undergo a more extended quarantine period.

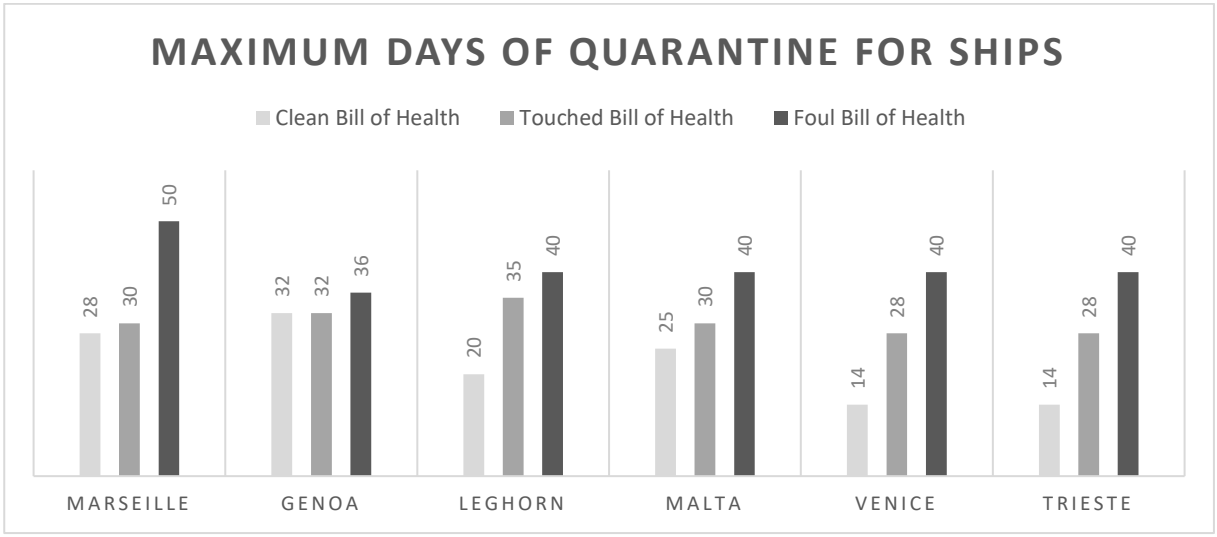
The quarantine period was not standardized among ports, as each had its own rules. Attempts of standardizing quarantine practices were made in the second half of the 19th century with international conferences that will be analysed in the following chapters. For example, with a "clean" bill of health, a ship would be subjected to 14 days of quarantine in Venice and Trieste and 32 in Genoa, while an average of 40 days had to be respected for ships carrying a "foul" bill of health in most of the Mediterranean ports. It is important to note that the quarantine period differed for cargo, crew members and ships, and passengers.

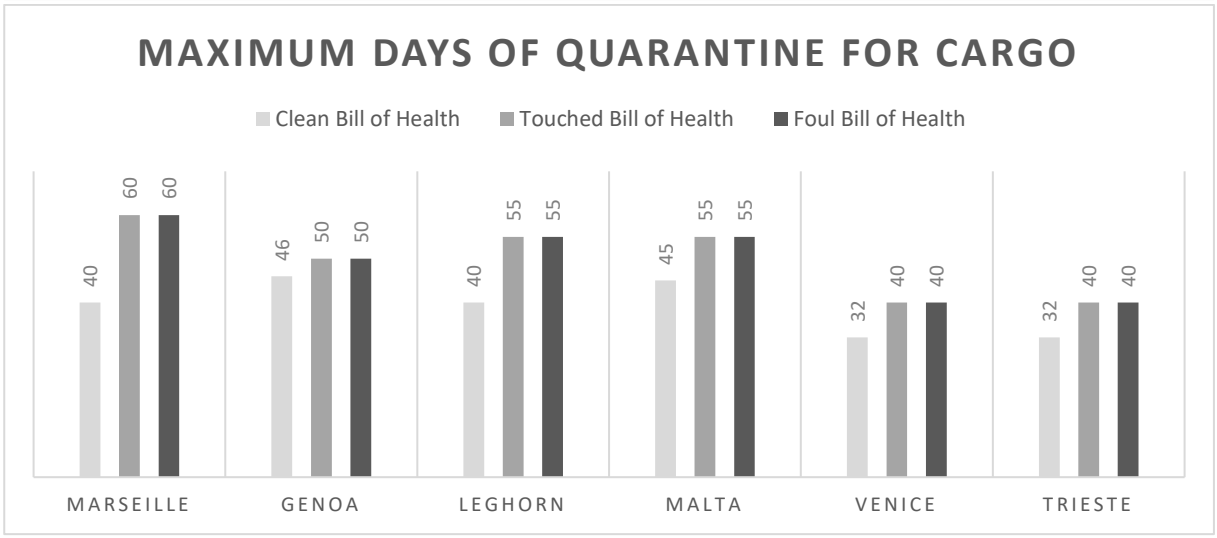
The graphics below (Fig.5) show how the maximum days of quarantine varied depending on the bill of health in six of the major ports in the Mediterranean Sea. However, the duration of quarantine was not fixed and could allow for a certain margin of variation depending on the health

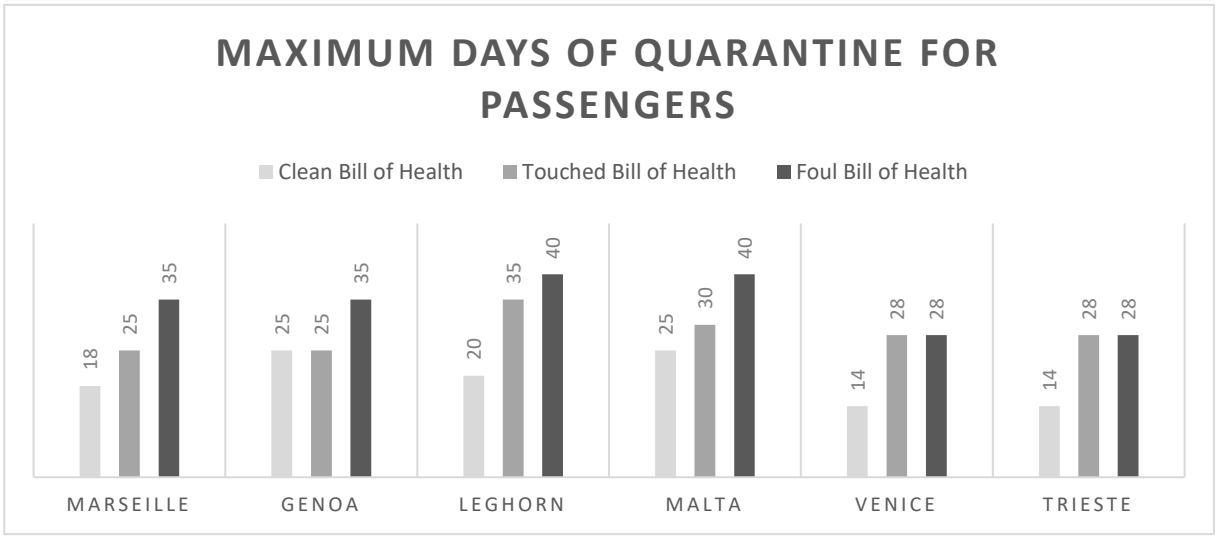
[101] Joel, L. (1879). *A Consul's Manual and Shipowner's and Shipmaster's Practical Guide: In Their Transactions Abroad*. London: C. Kegan Paul & Co, p.239.

authorities' discretion. For example, with a foul bill of health, authorities in the port of Marseille could decide to quarantine an incoming ship for a period of thirty-five days up to fifty days. Similarly, cargo may be quarantined for forty days to sixty. In Genoa, reductions from the maximum quarantine can be three days for passengers with a touched or a clean bill of health. In Leghorn, passengers with a touched bill of health can spend up to fifteen days less than the maximum term, up to five days less for cargo under a clean bill of health and only two less for passengers.

FIGURE 2: DURATION OF THE MAXIMUM LENGTH OF QUARANTINE EXPRESSED IN DAYS FOR SHIPS, PASSENGERS, AND CARGO USING DIFFERENT BILLS OF HEALTH AT THE END OF THE 18TH CENTURY. SELF-PRODUCED GRAPHICS BASED ON DATA EXTRACTED FROM PANZAC, D. (1986).







2.3 DISTRIBUTION OF VACCINES IN THE 19TH CENTURY

Despite smallpox being a universal concern, there was no cohesive international cooperation in distributing the vaccines globally in the 19th century. However, vaccines were distributed across national borders, for example, to immunize far away colonies and other populations. For much of the 19th century, vaccines were not produced systematically in laboratories, as vaccines supply had to rely on the availability of the lymph, that is, the pus extracted from cows or the arms of recently vaccinated people. Additionally, the lymph removed by cows was scarce as the disease itself was rare, difficult to detect, and confined mainly in Europe. For example, one of the most significant suppliers of cowpox lymph at the beginning of the 19th century was the physician Luigi Sacco, based in Lombardy (Rusnock, 2009). Moreover, due to the limited technology available, vaccines could only last a short period before the virus inside would die.

In this regard, different methods were implemented to store the lymph for short-distance transport. For example, the vaccine pioneer, Jenner, used ivory points prepared with the lymph material. Alternative methods consisted of dried lymph onto silks threads or put between sealed glass plates. However, the most effective way to preserve the virus was human carriers, as recently infected people provided the best source of pus. However, it only lasted until their immune system would eliminate the virus. The practice of arm-to-arm vaccinations carried significant risks of transmitting other infectious diseases, such as hepatitis and syphilis. Nevertheless, in many cases, arm-to-arm vaccination was considered more acceptable than the use of lymph collected directly from cows. For example, physician Benjamin Moseley advanced critics that transferring "a bestial humour into the human frame"[102] may lead to "strange mutations from quadruped sympathy"[103] after years.

The global spread of vaccination proved to be one of the first landmarks in international sanitary cooperation. From Great Britain, as the first producer and then paralleled by other powers, smallpox vaccines were exported abroad. Logistics limitations were overcome due to people's ingenuity, sacrifice, and a dense information network constituted by personal correspondence, publications and people's travels. Furthermore, despite the political rivalry and ongoing wars, vaccines supplies were often given to allied and, to a certain extent, rival populations. Even when humanitarian reasons behind certain vaccination campaigns are debatable, their outcomes were almost always considered to be cost-effective. In this regard, European powers' vaccination campaigns in colonial possession can be considered a strategic move. Indeed, a smallpox-free colonial population allowed for

[102] Moseley, B. (1800). *A treatise on sugar: with miscellaneous medical observations*. London: John Nichols, p.183.
[103] Ibid.

significant resources from local and central governments, as its population would increase, providing more labour supply and pay more taxes, and trade would flow with fewer impediments.

Overall, the efforts to fight disease were close to becoming global for the first time, with unparalleled and specifically-designed international vaccination campaigns. However, international distribution of vaccine supplies was not organized by any international body as they were under the supervision of each countries' boards of health and public institutions. Additionally, the lack of standardization practices in vaccines' production, administration and storage led to many failures in the vaccination process.

2.3.1 The Royal Philanthropic Vaccine Expedition

The first example of an international vaccination campaign can be found in the Kingdom of Spain under the rule of Charles IV, with the so-called Balmis expedition of 1803. The king aimed to vaccinate the Spanish colonies' population as smallpox outbreaks regularly hit the region. To this end, the King appointed the physician Francisco Javier de Balmis to lead an expedition to the New World to distribute the vaccine. Once arrived, the expedition split and continued in South and Central America and finally reached the Philippines in 1805. Mark & Rigau-Pérez (2009) identify in the Spanish expedition modern characteristics such as its central planning, its execution by specialized staff assigned exclusively on the subject, short-term objectives to immunize the population in different geographical areas, and the long-term goals of institutionalization of administrative bodies. Possibly, the Royal Expedition was also the first humanitarian international mission (Franco-Paredes et al., 2005) as the authors consider this expedition as a "pioneering event in international health".[104]

The reasons behind the expedition remain unclear. It can be assumed that the vaccination campaign had strategic importance in an international environment of competition between colonizing powers. The campaign itself suffered significant delays due to naval battles between Spain and Great Britain.[105] Notably, while smallpox's morbidity and mortality rates in Spain were like other European countries, it ravaged to a greater extent in the Spanish overseas colonies than northern

[104] Franco-Paredes, et. al., (2005, November 01). The Spanish Royal Philanthropic Expedition to Bring Smallpox Vaccination to the New World and Asia in the 19th Century. *Clinical Infectious Diseases*, 41(9), p.1285.

[105] For example, the expeditionary force encountered travel difficulties by the end of November 1807. The assistant Grajales and the nurse Bolaños suffered delays in their voyage from Lima to coastal areas of Chile due to the intense maritime battles between Spain and Great Britain. Núñez Freile, B., & Núñez Cifuentes, I. (2005, June). *La expedición de los niños héroes: 16 de julio de 1805 bicentenario de la llegada de la vacuna de la viruela a la Real Audiencia de Quito*. CAMBIOS Organo Oficial de Difusión Científica H.C.A.M, 4(7), p.23. Retrieved August 21, 2021, from http://www.dspace.uce.edu.ec/handle/25000/4461

territories ruled by the British and French. The impact of smallpox on the royal family may have also played an important part. Several members of the King's family contracted smallpox, which led to the death of his daughter. Such a tragic event may have influenced him in commissioning the expedition, or, simply put, the King designed it according to his philanthropy. Additionally, another crucial element in framing the expedition can be found in the demographic transition of the 18th century, together with Enlightenment ideals that conceived the state's population as a source of richness, especially the children.

This unilateral campaign from Spain allowed a mass vaccination program free of charge, the transfer of information on developing a stable supply of vaccines, and organising vaccination boards to record the campaign and ensure the adequate stockpiling of vaccines from public authorities. For example, following the expedition's arrival in Venezuela, the *Junta de la Vacuna* was established. It was the first public institution in the American continent in charge of the administrative and technical tasks required to provide a permanent vaccination campaign. Similar institutions called *Junta Central de la Vacuna* were established in Mexico and the Viceroyalty of Nueva Grenada.[106] In the latter, in Santa Fé de Bogotá, a higher institutional body was set up, the *Junta de Sanidad* and in Peru was established the *Junta Conservadora del Fluido Vacuno*. The highest civil, religious, and military authorities were represented there, remarking the vaccine campaign's great importance (Quirós, 1996).

To ensure that the vaccine was effectively transported to the other side of the Atlantic,[107] human carriers were selected in addition to glass vials. To this end, twenty-two children aged four to ten years old were chosen from an orphanage in La Coruña to provide arm-to-arm vaccination. Two children received the vaccine before departing, and eventually, the others underwent the practice in pairs roughly every seven days. Once they arrived, they found new homes in the New World, probably in Mexico (Mahía, 2003). Eventually, other children took their places to continue the vaccination campaign (McIntyre & Houston, 1999). Interestingly, despite the widespread slavery in the Spanish colonies, enslaved people too were given the vaccine. In Montevideo, they had priority as they were classified as a "risk group".[108]

The Balmi expedition is worth mentioning not only for the mass vaccination program itself but because it was one of the clearest examples of sanitary cooperation during the 19th century. The

[106] The Viceroyalty of Nueva Grenada was a jurisdiction of the Spanish Empire corresponding to present-day Colombia, Ecuador, Panama, and Venezuela.
[107] In the American continent the countries that were visited by the expedition are present-day Puerto Rico, Venezuela, Colombia, Ecuador, Peru, Chile, and Bolivia.
[108] Portillo, J. (1995, June). Historia de la medicina estatal en Uruguay (1724 - 1930). *Revista Médica del Uruguay*, 11(1), p.11. Retrieved August 19, 2021, from http://www.rmu.org.uy/revista/1995v1/art2.pdf

expedition thus enabled the transfer and institutionalization of new sanitary technology to the Americas and the Philippines. However, it is also worth mentioning that the vaccine was already present in the American continent as vaccines were already used in North America and many Spanish colonies.

For example, on the island of Vieques (present-day Puerto Rico), public authorities obtained the vaccine from the nearby island of Saint Thomas, which was under Danish rule. Furthermore, the vaccine was already present in Cuba, which spread to many Mexican cities before Balmi's arrival. However, the vaccination campaign had many failures in Mexico and was consequently improved by the Spanish expedition. In Peru, the vaccine was introduced before José Salvany — Balmis' assistant and leader of the expedition in South America —. There, Doctor Pedro Belomo[109] already started vaccinating in Lima in October 1805. Belomo brought the vaccine from Buenos Aires to Lima stored in glass vials to fight a smallpox outbreak that occurred three years before the expedition's arrival (Lastres, 1951). Yet, in Lima, doctors sold the vaccine rather than giving it free and charged patients based on their economic availability, thus fomenting distrust by the locals. Eventually, Salvany's expedition was welcomed and gained the trust of local communities.

In Asia, to boost the vaccination campaign in Canton, Balmis obtained the help of the British East India Company in October 1805. Although the vaccination in China proved to be a fiasco, this sanitary collaboration is worth to be mentioned as it coincided with the escalation of the conflict that involved Spain and Britain that culminated in the Trafalgar naval battle. Eventually, Balmis docked at the island of Saint Helena, controlled by the British, to distribute the vaccine to the local population for the first time. On a final note, the expedition was claimed to be a success by Charles IV. After three years of the international campaign, the estimated number of people — mostly children — that received the vaccine varied from two hundred and fifty thousand (Rizzi, 2007) to more than a million (Núñez Freile & Núñez Cifuentes, 2005). Additionally, the discoverer of the vaccine, Jenner, in addressing the expeditions, wrote, "I don't imagine the annals of history furnish an example of philanthropy so noble, so extensive as this".[110]

[109] Military doctor and surgeon Pedro Belomo is considered to be the first vaccinator in Peru. Martín, S. M. (2018). *Pedro Belomo*. Retrieved August 21, 2021, from Real academia de la historia: https://dbe.rah.es/biografias/45665/pedro-belomo

[110] *Letter from Dr. Jenner to Reverend Mr. Dibbin on 22 November 1806* as quoted by Tarrago, R. E. (2001). The Balmis-Salvany Smallpox Expedition: The First Public Health Vaccination Campaign in South America. *Perspectives in Health*, 6(1). Retrieved August 19, 2021, from https://www3.paho.org/English/DD/PIN/Number11_article6.htm

2.3.2 Introduction of the vaccine in the British Colonies

As the birthplace of vaccination practice, Britain was the earliest supplier of vaccines, and Jenner himself aimed to spread such practice in East Europe, Asia, and Africa. Additionally, he wished to send significant supplies to the British Colonies in the east. To this end, he shipped dried lymph to India, but the vaccine proved to be ineffective. Moreover, ample supplies of the vaccine were lost due to shipwreck and several other ships were loaded with vaccine supplies but failed to deliver them safely. Like the Spanish expedition, Jenner advanced the idea to use men as human carriers for the lymph during the voyage to India. However, Jenner's plans were rejected. Nevertheless, vaccine supplies were successfully sent from Vienna to Bombay by Genevan doctor Jean De Carro by keeping the lymph in a fluid state. Additionally, De Carro was also responsible for the spread of vaccines in Poland, Greece, Venice, and Constantinople (Rusnock, 2009).

The East India Company played a prominent role in promoting the vaccination campaign in India. As the costs of the campaign were justified by the "increased resources derived from abundant population",[111] a comprehensive approach made up of British doctors, local vaccinators, and support from Indian royal exponents was put in place. However, the vaccination campaign proved difficult due to severe local resistance as variolation was deemed more acceptable than the European vaccination (Brimnes, 2004). In addition to that, the arm-to-arm vaccination contrasted local culture and Hindu religion notions of purity.

In the Mediterranean, the British government carried out a vaccination campaign for its overseas territories in 1801. The head of the expeditions were two military physicians, John Walker and J. H. Marshall. They travelled first to Gibraltar and vaccinated the local British garrison. The same outcome was carried out in Minorca, Malta, Egypt, and British soldiers stationed in Naples and Palermo. In Sicily, for example, vaccines were also given to the local population. At the hospital in Palermo, "men, women, and children, conducted through the streets by a priest carrying a cross, come to be inoculated".[112] In this way, the involvement of religious authorities made it easier for the vaccination campaign to be successful as it reduced the degree of resistance from the population.

[111] Nigel Chancellor's remarks. Alluri, A. (2020, September 20). *The Indian queens who modelled for the world's first vaccine*. Retrieved August 27, 2021, from British Broadcasting Corporation: https://www.bbc.com/news/world-asia-india-53944723

[112] Baron, J. (1838). *The Life of Edward Jenner M.D.: With Illustrations of his Doctrines, and Selections from his Correspondence* (Vol. 1). London: London H. Colburn, p.403.

2.3.3 Vaccines and Indians in the United States

In the American continent, vaccine campaigns were established. Additionally, as early as 1802, many federal states of the United States (U.S.) could count on their vaccine production extracted from cows. For example, in Louisiana, soon after being purchased by the U.S. from France, vaccines were given free of charge to Americans and Native Americans alike. President Jefferson boosted the vaccination campaign by providing vaccines to explorers to instruct and convince native tribes to use them. Among the Abenaquis tribe, the vaccination was successful. Eventually, they received a book from Jenner himself with instructions on the vaccination practice, and the Abenaki's response of appreciation can be considered as evidence of the initial success of the campaign:

> "Brother, Our Father has delivered to us the book you sent to instruct us how to use the discovery which the Great Spirit made to you, whereby the small-pox, that fatal enemy of our tribe, may be driven from the earth. [...] We shall not fail to teach our children to speak the name of Jenner and to thank the Great Spirit for the bestowing upon him so much wisdom and so much benevolence."[113]

However, a more extensive and comprehensive vaccination campaign did not introduce the vaccines to the Abenakis until twenty-five years later. Ironically, the vaccination program for the Indians coincided with their forced resettlement under the Indian Removal Act of 1830,[114] which put American authorities in charge of resettling the Indians from their territories to newly designated areas west of the Mississippi River.

2.3.4 Vaccination in Napoleonic Italy

The Napoleonic rule in Italy created and supported an efficient and state-controlled vaccination program. One of the first vaccinations campaigns took place in Piedmont, where the introduction of the smallpox vaccine is attributed to Michele Buniva. In November 1800, Buniva successfully delivered the lymph in Turin and launched a propaganda campaign to create consensus among experts and the local population (Carpanetto, 2004). In 1801 the first vaccine supply sent by Sacco reached Florence. The vaccination campaign was further developed in Tuscany, especially after establishing the Vaccination Committee in Florence in 1808, spreading shortly after in other Tuscan districts. Most notably, in the principality of Lucca and Piombino on the 25 December 1806, vaccination of newborns became mandatory for the first time in European legislation (Bercé, 1985).

[113] Address sent by the Five Nations Indians on 8 November 1807 to Edward Jenner. As quoted by Heagerty, J. J. (1928a). *Four centuries of medical history in Canada*, (Vol. 1), p.49.
[114] The Indian Removal Act was signed into law by the President Andrew Jackson on 28 May 1830.

In Napoleonic Italy, a dedicated general director of vaccination was appointed (Decree of 9 May 1804 n.55 §1). Overall, much attention was given to health policies controlled directly by the state through the Central Health Magistrate. Such an institution was in charge of preventing the spread of epidemics from foreign states. Interestingly, a violation of health rules such as attempting to escape from quarantine during a declared sanitary crisis may have resulted in the death penalty (Decree of 13 November 1804 n.131 §5).

The vaccination campaign was carried out systematically in Italy and many parts of Europe, to the extent that it reached, according to the General Secretary of the Ministry of the Interior, Michele Vismara, a "general consensus of the most highlighted governments".[115] Indeed, as Grab (2018) points out, Italian officials were heavily influenced by scholarly discourses in France and local thinkers of the Enlightenment. Furthermore, the author suggests that there was significant cooperation among state and local officials, including the clergy, to address the common goal of immunising the Italian population. Indeed, the success of the vaccination campaign was possible only due to a solid political response and the involvement of public authorities, as confirmed by Porro (2012). In this regard, the church's support played a significant role in convincing the population to get vaccinated. For example, the campaign was supported by a religious text supposedly written by the bishop of Goldstat (1805) that successfully increased the acceptance of the vaccine. However, Ferrario (1858) confirmed that such Bishop never existed, and Sacco presumably wrote the text.

Particularly in Northern Italy, the vaccination campaign was successful during the Cisalpine Republic. In this regard, the appointed General Director of Vaccination, Luigi Sacco, played a prominent role in promoting and administrating vaccines. He discovered cowpox in herds in Lombardy, which fuelled the vaccination campaign in Italy. He then exported the matter also abroad. Sacco shared information regarding the vaccination's progress also outside the Reign of Italy, such as Prussia, Baviera, Etruria, Lucca, and Parma, all of whom, according to Sacco (1809), followed the "shining example of the Italian government" [116] that by 1809 performed around 1,500.000 vaccinations. Henceforth, Sacco (1803) stressed the need for an international response against smallpox. Indeed, the author emphasised international cooperation among European countries with the scope of eradicating smallpox; otherwise, the negligence of a country may nullify the progress of the other. Likewise, a Medical Committee in Britain (1804) unanimously concluded that smallpox could only be defeated in Europe through a European response.

[115] Translated from Italian. Italian Republic. (1802). *Bollettino delle Leggi della Repubblica Italiana. Dalla Costituzione proclamata nei Comizi in Lione al 31 dicembre 1802*. Milano: Veladini Luigi, p.420.
[116] Sacco (1809). *Trattato di vaccinazione con osservazioni sul giavardo e vajuolo pecorino*. Milano: Mussi, p.16.

2.4 HEADING TOWARD AN INTERNATIONAL SANITARY SYSTEM

The second half of the 19th century was characterised by an unprecedented desire to cooperate in sanitary matters and reform the sanitary legal framework. However, to better understand its roots, it's crucial to analyse the historical context of the 19th century at large. The end of the Napoleonic wars that marked the first decades of the 19th century helped resume international trade with all its vigour. Generally, most European countries and other powers in the East Mediterranean, most notably Egypt, experienced unprecedented interconnection. However, with the defeat of France, Britain stood as the unmatched maritime power. Britain accounted for one-fourth of the world industrial manufacture and roughly the same regarding the share of international commerce (Cameron, 1993). Arguably, globalisation increased exponentially. Undoubtedly, after the mid-19th century, as Stearns (2010) suggested, other actors — mainly the U.S., Germany and Italy — increased their share of international commerce, thus competing against Britain.

Because of the increased international trade, sanitary regulations — particularly quarantine — underwent profound discussion during the early 19th century. Within such sanitary discourse, two elements emerged. Firstly, mercantile economic interests. As McDonald (1951) and Harrison (2006) suggested, a strong impulse for rediscussing quarantine came from the cotton industry. Indeed, in early 19th-century Britain, cotton commerce became one of the primary sources of economic power. In 1823, Britain started to import considerable quantities of cotton from Egypt, as it was considered one of the finest cotton available in the market (Baines, 1835).

The British Parliament appointed a committee to discuss quarantine rules. Because of relatively rigid quarantine in Britain, countries such as Holland with more relaxed quarantine laws could compete easier against the British. For example, the Greeks often sent merchandise first to Holland and then to Britain to avoid British quarantine rules and charges. Quarantine taxes were sensibly higher in Britain — between twenty-five to fifty times higher — than in other ports in Holland or the Mediterranean region. Interestingly, the Committee stressed that quarantine charges in Britain followed the "unequal and unjust"[117] principle of charging ships for their freight tonnage rather than its value.

The Committee considered quarantine rules in Britain to create "great disadvantages in competition with Holland",[118] which also prevented Britain from "being a place of transit or deposit

[117] Select Committee on the Foreign Trade of the Country. (1824). *Report of the Select Committee*. p.7.
[118] Ibid, p.6.

for Mediterranean produce".[119] Thus, British ships were "deprived of the freight".[120] Furthermore, the Committee acknowledged that quarantine and the doctrine of contagion were inherently connected; therefore, only contagionists' medical experts were consulted. The Committee proposed a reduction of quarantine charges that should be "borne by the public"[121] and not by incoming vessels. Eventually, little relaxation of quarantine was suggested because the law was considered "more than sufficient".[122]

As stressed by Harrison (2006), the second element refers to a firm consciousness of the risks related to diseases originated abroad that was strongly developed already by the end of the 18th. Among such diseases that disrupted commercial activities, yellow fever played a crucial part. For example, yellow fever was imported from Veracruz to Cádiz and then to Leghorn, where it caused an epidemic in 1804. However, its causes were unclear, as proved by the debate among contagionists and anti-contagionists reported in Tomassini (1805). Strict sanitary measures were set up to fight the epidemic and included social distancing, quarantine and sanitization of environments, which eventually caused significant economic losses. Furthermore, as Palloni (1804) noted, port cities were more likely to get infected with yellow fever than inland cities.

Additionally, in the early 19th century, the plague imported from the Ottoman Empire hit the Mediterranean region. The plague appeared in the Balkans, in Malta, Egypt and Corfu. In the latter, in Marathia, the plague appeared in December 1815. Corfu was under British rule, and a sanitary cordon was promptly established around the infected area. Inside the infected villages, religious ceremonies were held because the disease was thought to come from an "angry spirit", [123] complicating the contact tracing of the individuals potentially exposed to the disease. Overall, the tragic plague outbreak in a region with such a dense mercantile network highlighted the awareness of many countries about health risks connected with importable diseases.

Consequently, the countries most exposed to infectious diseases were reluctant to relax quarantine rules. Indeed, with the second pandemic of cholera from India reaching Russia and parts of Europe, most countries relied on strict quarantine impositions. However, there was no cohesive medical thought on the origin of the disease and the dualism between contagionists and anti-contagionists peaked. As Evans (1988) reported, where the mercantile interests were strongest, quarantine rules were milder, such as in the case of Hamburg. Similarly, the anti-contagionist view

[119] Ibid.
[120] Ibid.
[121] Ibid, p.10.
[122] Ibid, p.8.
[123] Tully, J. D. (1821). *The history of the plague*. London: Longman & Co, p.94.

gained ground in Britain as it preserved commerce and contributed to maintaining public order. Simultaneously, anti-contagionists increased their importance in France, one of the first countries attempting to regulate quarantine at the international level. On the contrary, Prussia, which had fewer commercial interests, had stricter quarantine rules and publicly declared cholera to be contagious.

Yet, the international discussion was based chiefly on plague, and so it was the entire system of lazarettos and quarantine stations. Ressentiment against quarantine was gaining ground in Europe and many other countries, such as Egypt, where the viceroy Muhammed Ali faced severe plague and cholera epidemics. Consequently, Egyptian goods were subjected to a lengthy quarantine in European ports. Due to Egypt's dependence on exports, Muhammed Ali imposed stricter quarantine rules against incoming ships and pilgrims in the hope to gain Europeans' trust that would lead to a relaxation of sanitary measures imposed on Egyptian goods.

Moreover, in Egypt, it can be found one significant example of international sanitary cooperation: the Consular Quarantine Board in Alexandria. In 1833, seventeen consular representatives met and appointed a five-person committee — the Quarantine Board — composed of the consuls general of Austria, England, France, Russia, and Tuscany. Several European physicians and inspectors were moved to the sanitary cordon around Alexandria (Kuhnke, 1990). However, despite the extraordinary power it was granted, the Quarantine Board failed to prevent the outbreak, and it was soon dismissed. Overall, it was a sign of deep interest and commitment of foreign countries in international sanitary cooperation. It is worthy of notice that European assistance to establish quarantine stations was also given to the Ottoman sultan and Tunis's bey.

Eventually, the French Minister of Commerce took a significant step in understanding and comparing how different European lazarettos worked. Even though the British John Howard, as shown in chapter 2.2.2, already explored different European lazarettos in 1785, providing a detailed comparison, Pierre Ségur-Dupeyron was appointed to carry out such a study. Therefore, Dupeyron (1834) examined the purification methods, how the lazarettos were organised and administered, and the length and rules of quarantine. The author recognised the connection of commerce with the plague and lazarettos' crucial role in preventing further plague outbreaks. He concluded that sanitary regulations through quarantine stations were necessary — as the plague was likely to be contagious — but quarantine length ought to be reduced. For example, in the case of ships coming from the U.S. and the Antilles carrying a clean bill of health, no observation quarantine should have been imposed. Noteworthy, he stressed that even in the case of hostilities among countries, the length of quarantine should remain unaffected. Besides, the author stressed the need for improved international

cooperation; thus, he aimed to reach a point where health regulations would be implemented internationally in a "reasonable and uniform state of affairs"[124] through an international reunion.

In 1838, the French government accepted Dupeyron's suggestion and proposed an international conference to uniform quarantine regulations with binding resolutions. Therefore, France invited various powers with possessions in the Mediterranean Sea. Henceforth, France asked Great Britain, which agreed on the proposal, and Austria agreed in its "principle and substance"[125] despite a certain reluctance. The same invite was delivered to Naples, Rome, Sardinia, and Tuscany. Interestingly, the Earl of Aberdeen (personal communication, 27 June 1843) wrote to Lord Cowley, Britain's ambassador in France, that the British government suggested discussing the matter together first with France and Austria, as the latter could use its influence on the Italian States and persuade them to cooperate. Additionally, the British government proposed to include other powers in the conference: Russia, because of its possessions in the Black Sea and Turkey, as one of the most plague-infected regions.

However, the conference did not take place. On the one hand, because of the lack of medical knowledge, as accused by Austria, over the required minimum and maximum quarantine length for persons, goods, and the methods of disinfection of merchandise (Milroy, 1846). On the other hand, because of a lack of consensus on the meeting place (MacGregor, personal communication, 2 March 1844). Indeed, Britain suggested that the meeting should have taken place in Genoa for its neutral position, while France suggested Marseille or Trieste and Austria proposed Vienna. Such difficulties in finding a suitable place denoted, to a certain extent, a mutual distrust that led the powers to prefer a place where they could have exerted some degree of influence and control. Overall, it is worthy of notice that both authors — Milroy and MacGregor — stressed the importance of uniform quarantine regulations. According to the former, they would be helpful for the "common welfare"[126] and for the latter to remedy the "abuses and inconsistencies"[127] of the quarantine system.

Austrian authorities already made similar remarks in 1836 against Britain. According to Prince Esterhazy's letter to Henry J. Temple (Britain's Foreign Secretary at the time, commonly referred to

[124] Dupeyron. (1834). *Rapport adressé à son exc. le ministre du commerce.* Paris: Imprimerie Royale, p.85.
[125] House of Commons. (1846). Letter from The Earl of Aberdeen to Lord Cowley, June 27 1843. In *Correspondence respecting the quarantine laws since the correspondence last presented to parliament. In Parliamentary Papers* (Vol. 45). London: T. R. Harrison, p.1.
[126] Milroy, G. (1846). *Quarantine and the plague: being a summary of the report on these subjects recently addressed to the Royal Academy of Medicine in France*. London: Samuel Highley, p.5.
[127] House of Commons. (1846). Letter from Mr. MacGregor to Viscount Canning, 2 March 1844. In *Correspondence respecting the quarantine laws since the correspondence last presented to parliament. Parliamentary Papers* (Vol. 45). London: T. R. Harrison, p.5.

as Viscount Palmerston), British quarantine rules were "oppressive".[128] The author stated that the quarantine period in the Ionian Islands was fixed at fourteen days when cholera appeared in the Austrian controlled Venice and Trieste. Yet, when the disease spread to nearby countries, the quarantine period increased and reached forty-two days, which sometimes extended due to lazaretto's delays and adverse weather. Such sanitary rules effectively denied any possibility of commerce between Austria and the Ionian Islands to the extent that Austrian captains of vessels expressed their preference of being unemployed rather than subdue to such rules.

A solid impulse to relax quarantine came from new regulations and institutional bodies created in Eastern Europe, such as Wallachia, Moldavia, Greece, Egypt and Turkey. In this regard, Metternich remarked in 1838 that the systematic opposition to sanitary practices in such places "no longer exist[ed]".[129] Additionally, the Commission of Public Health instituted in Constantinople was under the influence and expertise of European powers. Thus, the plan to uniform quarantine regulation would be facilitated. Metternich suggested, in line with Britain, to invite Russia to the upcoming conference, to which he proposed adding Greece due to its proximity to the Levant. Interestingly, Metternich opposed the inclusion of cholera and yellow fever into the discussion of quarantine rules due to the lack of medical consensus over the transmission and treatment of such diseases.

Simultaneously to the discussions between the major powers, the British government commissioned a study similar in substance and conclusions to Dupeyron's (1834) report. The military surgeon William Pym visited several lazarettos in the Mediterranean, the Adriatic and the Levant. The author highlighted the uncoordinated enforcement of quarantine. For example, Pym (personal communication, 16 June 1845) reported that the Papal States were reluctant to relax quarantine to avoid subduing quarantine themselves in the neighbouring ports of Naples, Genoa, Leghorn and Marseilles.

However, Ancona was granted free practice with Trieste; thus, passengers in a ship arriving in Ancona from the Ionian Islands may have preferred to disembark in Trieste and then board another vessel to reach Ancona, avoiding being enclosed in a lazaretto. Trieste, in turn, had a more relaxed quarantine for passengers. The author also highlighted that sanitary rules were often kept in place to employ the poor or collect money, which was common in the Italian States, instead of being used exclusively for their alleged efficacy as preventive measures. Moreover, the author emphasised the

[128] House of Commons. (1843). Letter from Prince Esterhazy to Palmerston, 19 November 1836. *In Correspondence relative to the contagion of plague, and the quarantine regulations of foreign countries. 1836-1843*. London: T.R. Harrison.
[129] Ibid. Letter from Prince Metternich to Baron Langsdorff, 13 July 1838.

need for a more standardised quarantine system among all interested states. A reformed and reduced quarantine and not its dismantlement was thus necessary.

Despite a certain degree of incertitude to move forward with an international agreement, the wealth generated by international commerce proved to be a strong force in promoting the desired reduction in quarantine. Indeed, France was extending its trade in the Mediterranean thanks to its recently acquired possession in Algeria. Similarly, by the mid-19th century, Britain actively advocated for free trade, much contrasted by quarantine rules. Overall, the opening to commerce with the Ottoman Empire by major powers helped to re-consider impediments to trade. Additionally, according to Harrison (2006), Austria, France, Great Britain, Prussia, and Russia exploited the weakness of the Ottoman Empire in war with Egypt to obtain concession about trade and navigation.

It is crucial to notice that the mid-19th century experienced a significant movement of people from Britain to its colonial possessions, mainly India. In this regard, Arthur (1839) emphasised the "contradictions, absurdities, and inconsistencies"[130] of the whole quarantine system of British travellers that passed through the Levant. In addition to that, it is worth mentioning the critics against quarantine being used for political means. In this regard, Bowring (personal speech, 15 March 1842) stressed that official dispatches passing through the Levant, after undergoing "absurd modes of purification", [131] were "transmitted to their destination in a mutilated, and scarcely legible condition"[132] in order to interfere with governmental affairs. In the author's view, quarantine regulations were supported by political interests and not merely health reasons.

Additionally, the British Consul at Damascus (personal communication, 1840, as cited by Bowring, 1842) accused Russian quarantine officials of being "political functionaries"[133] that "arrested and released travellers at will".[134] Furthermore, in the author's view, they arbitrarily influenced commerce by favouring one merchant over another. The author states that Russian officials "in the name of the public health, they introduced a system of universal police and espionage".[135] Henceforth, according to the author, international negotiations on quarantine had to be carried out to reach an international agreement.

[130] Holroyd (1839). *The quarantine laws, their abuses and inconsistencies. A letter addressed to the Rt. Hon*. Sir John Cam Hobhouse. London: Simpkin, Marshall & Co, p.64.
[131] Bowring (1842). Commons Sitting of 15 March 1842, *Quarantine*. Retrieved October 14, 2021, from API Parliament UK: https://api.parliament.uk/historic-hansard/commons/1842/mar/15/quarantine
[132] Ibid.
[133] Ibid.
[134] Ibid.
[135] Ibid.

As Harrison (2006) highlights, the Congress of Vienna of 1815 was a "vital precondition"[136] for whatsoever agreement over sanitary matters. Indeed, it was thanks to such a diplomatic milestone if European powers extensively used diplomacy to overcome mutual tensions instead of waging war, at least until the Crimean War of 1853-56. Therefore, diplomacy and negotiations stood as a first choice, and the international environment was more accommodating to international conferences among European powers. Eventually, France continued to promote and advocate for an international conference that finally took place in Paris in 1851, addressed in the next section.

[136] Harrison (2006). *Disease, diplomacy and international commerce* (L. S. Science, Ed.), p. 212.

2.5 THE FIRST MILESTONE: THE PARIS CONFERENCE OF 1851

This chapter explores the negotiation process and goals of the first International Sanitary Conference (ISC) of 1851. The 1851 Paris sanitary conference is generally considered a breakthrough in public health management. It aimed at producing a legally binding, multilateral international agreement. Arguably, from an international relations standpoint, the ISC created a new phase of international sanitary cooperation, enabling a system where states could actively cooperate against diseases; thus, it can be considered one of the first stepping stones for international cooperation in health affairs. The scientific background and medical knowledge that characterized the context of the ISC was highly fragmented. Delegates found themselves divided by the dualism of contagionists and anti-contagionists, which resulted in harsh debates about implementing sanitary preventive measures and reforming the quarantine system and bills of health. This chapter revolves around three aims: (I) providing a general picture of the ISC discussions with a focus on cholera debates; (II) exploring the role played by diplomacy, science and the actors involved and (III) exposing the main agreed resolutions of the envisaged uniform system of public health in the Mediterranean.

Twelve countries participated in the ISC: Austria, England, France, Greece, Portugal, the Papal States, Russia, Sardinia, Spain, Turkey, Tuscany and the Kingdom of Two Sicilies. The ISC's objective was to create a standardized set of sanitary rules among the existing quarantine stations in the Mediterranean region. Each participating country could appoint a doctor and a consul. The first one was supposed to contribute with medical and scientific expertise. The latter contributed with administrative and diplomatic knowledge, defending the interest of the respective country in finding a compromise between promoting international commerce and protecting public health. No merchant was allowed to participate in the ISC despite a significant push for the relaxation of quarantine derived from the merchant class, which, by contrast, had a considerable influence at the local level. For example, the Board of Health in Marseille was mainly composed of merchants, and it was a model that could also be exported abroad, according to Ségur-Dupeyron. Furthermore, within the Mediterranean context, merchants were not directly and significantly influential at the international level, as the defence of commercial interests was mainly a diplomatic affair carried out by consuls.

Originally, the ISC was exclusively supposed to discuss preventive measures against plague and yellow fever, generally considered contagious. Despite initial reluctance to include other diseases in the discussion of the ISC, participating states agreed to include also cholera. Eventually, the conference revolved mainly around three diseases: plague, yellow fever, and cholera. It is unsurprising that cholera was added to the debate — and gained a central position in it — because

much of the urgency in establishing a universal sanitary system was owed to a significant extent to the disruption caused by the second and successive pandemics of cholera.

The opening remarks of the ISC's chairman C.E. David highlighted the conference's aims of creating a forum of conciliation. The delegates were expected to preserve commerce and navigation in the Mediterranean while safeguarding public health, despite contrasting medical theories and commercial interests. Delegates acknowledged that the new technological advancement, namely the railroads and steam vessels, allowed diseases to spread at unprecedented levels. Le Roy (1981) argued that during the Early Modern Period, infectious diseases spread globally to the extent of creating a "common market of viruses and other bacilli"[137] that would fit in in his concept of unification of the globe by disease. Undoubtedly, the same concept can be easily applied in the 19th century, but to a greater extent. Arguably, the steam engine, the increased international commerce, and the movement of people led to a new period of globalization of diseases. Huber (2006) further expanded LeRoy's concept and argued that the renewed international concerns demanded the unification of the globe against diseases rather than by diseases.

In this regard, the French delegate Mêlier acknowledged the interconnectedness of people and the new means of transportations which allowed individuals to mix, forming what he referred to as a "large family".[138] Thus, traditional barriers such as quarantine and sanitary cordons would be impossible and useless to set up. However, Huber (2006) points out that despite the ISC's professed internationalism and the notion of one large family, mostly European nations were invited to take part in the conference. Furthermore, the author suggests the existence of an ideological notion of superiority among the European powers against the Levant because of its less developed sanitary measures.

The lack of medical consensus over diseases' origins and the way they spread, especially in the case of cholera, caused a lengthy debate that heavily constrained the delegates' work. Consequently, the ISC's members agreed to avoid debating over mere scientific and medical theories. Science was supposed to guide the negotiation process, but it was not supposed to be the focal point of the debate. Yet, scientific and medical opinion jeopardized the discussions. The lack of reliable information about diseases' origins and spreading methods made it difficult for domestic institutions to formulate their

[137] Le Roy Ladurie, E. (1981). *The mind and method of the historian.* (S. Reynolds, & B. Reynolds, Trans.) Chicago: University of Chicago Press, p.12.
[138] French physician Mêlier (27 septembre 1851). *Procès-verbaux de la Conférence sanitaire internationale ouverte à Paris le 27 juillet 1851*. Paris: Imprimerie nationale, p.10.

preferences. Therefore, delegates likely faced uncertainties about the domestic win-set of their respective governments.

In framing diseases, delegates relied significantly on their convictions, thanks also to the weak control carried out by their respective governments over their work. Delegates' independence was possible due to the lengthy transfer of updates and orders from the governments to the delegates in Paris and vice-versa. In this regard, it is worth noting that Paris in 1851 was not connected with the telegraph network to other European capitals (Headrick, 1991). While the assumption that governments could hardly control their respective delegates can be considered valid, it did not apply to the French delegates. It is logical to deduct that the French government could easily communicate with them as they were located in the same city. Moreover, of the three secretaries appointed to assist the delegates in writing their proceedings, two had close family ties (son-in-low) with David and Mêlier, thus increasing the control over the work of the ISC (Almeida, 2012). Arguably, this highlights the importance of choosing the location when an international agreement must be discussed. Additionally, the voting system increased the individual independence of the delegates from their respective government, as votes were cast individually and not by states.

The classification of diseases within the ISC discussions was a troubled process. Delegates aimed at classifying diseases into two main groups: those that ought to be quarantined and those that did not. However, delegates found little room for agreement in classifying them. The most debated was cholera, which was still relatively new and on which there was the least medical consensus. In this regard, Ménis, the Austrian delegate and Bô, the Sardinian counterpart, proposed to leave cholera out of the discussion. Ménis considered cholera to be non-contagious, and quarantine rules were not applicable in his opinion. Additionally, to a certain extent, he relied on the divine interpretation of diseases, stating that cholera was a "divine wind […], a disease sent on Earth to punish those who do not know how to look after their own health".[139] In his view, the government ought to be more concerned about influencing individual behaviour in order to prevent diseases. Likewise, Bô considered cholera contagious but already endemic in Europe. Therefore, in his view, quarantine rules were useless to the same extent that other contagious diseases like smallpox were not subjected to specifically-designed quarantines, so he suggested that the best solution to cholera were hygienic measures.

The Papal States, Tuscany, the Two Sicilies, Spain and Greece advocated for quarantine against cholera, while Sardinia was the only Italian state to vote against it. Simultaneously, Austria, Britain

[139] Translated from French. Austrian physician Ménis (30 septembre 1851). *Procès-verbaux de la Conférence sanitaire international*. Paris: Imprimerie nationale, p. 13.

and France admitted that quarantine and sanitary cordons were impossible to put in place. A more neutral position was taken by Portugal, proposing an optional quarantine, and if established, it was supposed to be shorter than the one for yellow fever. However, avoiding the adoption of optional sanitary rules to be implemented at will by states was the reason at the foundations of the ISC.

Primarily because of the serious debate over cholera and quarantine measures against it, the conference appointed a committee to study the subject and other relevant issues before discussing it in the plenary session. The committee was composed of four physicians and three consuls. With a narrow margin,[140] the committee concluded that quarantine measures could not be imposed against cholera, and a country could not be banned from commerce because of cholera. More agreement was found regarding possible hygienic measures to be imposed against it. In this regard, a state could decide in exceptional cases to isolate a specific vessel if considered infected with diseases that threatened public health. Still, it was not intended to implement arbitrary quarantines against any participating country, and that quarantine measures would only be applied following an official declaration by the appointed authorities to avoid spreading false news about the presence of diseases.

Regarding the bills of health, the committee concluded with a wide margin[141] that only two bills of health were allowed: clean and foul, discharging the touched/suspected one on the basis that different countries may adopt a foul bill of health instead of a touched/suspected in an arbitrary way. Additionally, ships coming from Turkey with a clean bill of health were supposed to be admitted to the free practice. The committee aimed at distinguishing, for those diseases, two different forms in which they appear: “sporadic” and “epidemic”, yet no clear definitions of the terms were given. Distinguishing such forms proved difficult as delegates could not establish the boundaries between them. Despite that, such a distinction was confirmed, and the committee suggested that the length of quarantine was supposed to be harmonized through the following scheme:

[140] Four votes were cast in favour and three against.
[141] Six votes were cast in favour and one against.

Disease	Form	Minimum length	Maximum length
Plague	Sporadic/Epidemic	10	15
Yellow Fever	Sporadic Epidemic • Reported cases within ten days of navigation • Reported case after ten days of navigation	- 5 10	- 7 12
Cholera	-	-	-

The committee also suggested that the quarantine methods should vary according to the type of transported merchandise. For example, if a vessel carried a foul bill of health of plague, goods that were considered susceptible of transmitting diseases like wool, silks, and animal matters had to be disembarked and quarantined in the lazaretto. Disembarking cotton was left optional while all other goods could be admitted to free practice. A vessel carrying a foul bill of health of yellow fever would have its cargo aired but not disembarked. Interestingly, the committee promoted the integration of consuls within local health magistracies to give health institutions the "international character"[142] they deserve due to their "essence".[143]

During the plenary session, such measures underwent heavy debate. For example, vigorous opposition came from the appointed physician of the Two-Sicilies, Carbonaro, who highlighted the contradiction of keeping in place quarantine only for the plague — which in his view, no longer existed — and yellow fever, but not for cholera. He accused that the absence of quarantine for cholera was merely a matter of political economy rather than public health. Carbonaro went further, stressing the need to avoid giving local authorities a significant margin of appreciation in establishing when a vessel would be isolated or not. On the contrary, Bô noted how little was known about the "mysteries"[144] of cholera and how inexplicably spread between cities, regardless of sanitary cordons.

The Sardinian Consul General Magnetto supported his medical counterpart in stating that quarantine was useless, bringing the example of Gibraltar. There, cholera was treated as a non-

[142] International Sanitary Conference. (1852). *Procès-verbaux de la Conférence sanitaire internationale*, p.35.
[143] Ibid.
[144] Sardinian physician Bô (23 septembre 1851). *Procès-verbaux de la Conférence sanitaire internationale*. Paris: Imprimerie nationale, p.12.

contagious disease, while quarantine and sanitary cordons were established in the neighbouring Algeciras. The results were a morality rate in Algeciras three times higher than in Gibraltar. On the contrary, the physician of the Papal States, Cappello, praised his country's health magistracy efforts and the importance of quarantine and isolation in preventing the import of cholera. Indeed, the Papal States sent a commission in Paris in the 1830s to study cholera and concluded that it was an imported disease. Following the commission report, the health magistracy applied strict quarantine rules during the second wave of cholera, thus saving the city of Bologna, according to Cappello.

The Spanish physician Monlau cast doubts about the definitions of the hygienic measures advocated by those who contrasted quarantine against cholera. According to the Art. VI, hygienic measures were not mandatory; therefore, according to Monlau, they would add nothing to change the status quo. In his view, what was needed was "rational, sufficient, serious"[145] sanitary measures that could realistically be implemented, and quarantine ought to remain in place. The Greek physician Costi, supported by his diplomatic counterpart Vitalis, suggested a short quarantine of observation for ships coming from an infected place if their journey was five days long or less.

The Russian physician broadly shared the Greek position. Russia was one of the countries more severely hit by cholera. During the first visitation of cholera, the Russian government established strict quarantine rules, during which around 290.000 people died. Quarantine was abandoned for the successive wave of 1846-1849, and more than 880.000 people died. The increased spread of the disease under no quarantine rules may have influenced the Russian government to a more cautious approach, paired with increased doubts over its non-contagiousness. Overall, Rosemberg supported a short quarantine period given that, according to him, the incubation period of cholera did not exceed five days. He then suggested a comprehensive approach paired with hygienic measures, but not against merchandise, as in his opinion, it could not transmit the disease.

The Portuguese physician Grande warned about taking an unmovable position over quarantine, as it would nullify ISC's outcome: northern and central European countries would not implement quarantine. At the same time, southern states would not abandon it. Therefore, he suggested implementing rigorous hygienic measures and leaving quarantine optional. Similarly, the Turkish Consul General suggested implementing an observation quarantine for ships coming from infected places to facilitate a conciliation point between the two opposite positions about quarantine. He then reassured the European powers that Turkey was implementing an improved system of quarantine stations, ensuring safer commerce with Europe. Eventually, an agreement with a significant

[145] Spanish physician Monlau (27 septembre 1851). *Procès-verbaux de la Conférence sanitaire internationale*. Paris: Imprimerie nationale, p.19.

approval[146] on optional observation quarantine of three to five days and mandatory hygienic measures was found.

The discussion continued regarding yellow fever. Delegates disagreed whether yellow fever's "epidemic form" had to be distinguished from its "sporadic form". For example, the Spanish delegate pointed out the need to establish quarantine for ships coming from the Antilles, even with a clean bill of health, with the sole exception allowed during winter. However, the Italian ports of Genoa and Leghorn and the ones in Greece, Austria, and France admitted them to free practice.

Contrasting opinions were cast over the means of contagion through merchandise and whether they could transmit diseases at all. The heavy debate revolved around classifying merchandise that could carry pestilential germs and miasmas. Delegates' doubts focused on the following core questions: should the merchandise be classified based on animal or vegetable origins? Or should the merchandise continue to be classified as susceptible or non-susceptible? The Spanish physician suggested keeping the old system of susceptible and non-susceptible materials. In his view, soft and porous materials like cotton were more likely to absorb dangerous rotting matter; thus, they should be classified as susceptible. The Sardinian consul pointed out that if cotton gained the right to free practice regardless of the bill of health, most of the Italian ports would oppose it and consider the ports that allowed it as potentially infected place, thus jeopardizing, even more, the quarantine system.

Unsurprisingly, cotton gained much of the attention within the ISC's debate. As highlighted in the previous chapter, cotton's role in commerce significantly increased during the 19th century. The Greek physician believed that cotton was safe, as staff working in the lazarettos of Trieste and those in Greece never contracted the plague when inspecting ships carrying cotton. The Tuscan physician considered vegetable material — cotton in particular — to be safer than those derived from animals that could, for example, transmit anthrax.[147] A contrasting opinion was expressed by the British physician, who stated that putrefying vegetable matters caused the dangerous miasmas that developed into diseases. Therefore, he supported the distinction between vegetable and animal origins. In his view, the critical requirement that allowed the admittance to free practice were evaluating the cargo's condition. The Russian delegate stressed the need to classify cotton as a susceptible cargo because,

[146] Fifteen votes were cast in favour, four against and four delegates abstained.
[147] Anthrax is an infectious disease caused by *Bacillus anthracis.* Its skin form (to which the French physician Betti likely referred to) causes fever and also results in a small blister which typically turns into a painless ulcer. Its means of transmissibility were not clear at the time, but it was usually associated with animal furr (Batt, 1809). Already by the early 19th century there was widespread confusion about the term used to refer to anthrax, which was often confused with carbuncle, a different disease caused by *Anthrax staphylococcique.*

in his opinion, it could transmit the plague as it did with past epidemics,[148] a view also shared by the consul of the Papal States. Eventually, with 74% of the votes, the ISC adopted article twelve, which can be resumed as follows.

Classification of goods:

Class	**Goods**	**Sanitary measures**
1°	Clothes and personal belongings, rags, hides and skins, feathers, animals' hair and their parts, wool, silk	Mandatory quarantine and purification
2°	Cotton, hemp, line	Optional quarantine
3°	All goods not mentioned above	Exempted from quarantine

Sanitary measures:

Foul bill of health of plague	Quarantine for people, personal objects, cargo, letters and documents. 1st class goods must be unloaded and purified in a lazaretto; ships must be cleaned, aired, and fumigated with chlorine; letters and documents must be disinfected. Treatments for 2nd class goods are optional.
Foul bill of health of yellow fever	Voyage of at least ten days without suspected cases onboard: hygienic measures apply, cargo must be aired but not unloaded. Voyage of fewer than ten days with suspected cases onboard: same measures against plague apply but remain optional.
Foul bill of cholera	Ships must be aired; hygienic measures apply. Letters and documents must be purified, free practice for cargo.

[148] The Russian delegate Rosemberg referred to the plague epidemic started in Cairo of 1797 after the unloading of possibly infected soy and cotton from Damascus; and the plague of Odessa in 1826 due to a small quantity of cotton balls from Turkey.

Delegates also agreed that, after the official declaration by a competent authority that the epidemic is over, a fixed delay in terms of days must pass. In this regard, Art. XIII dictates that an epidemic of the plague would end after thirty days following the official declaration, for yellow fever would be required twenty days and ten days for cholera. Such change was a step forward from the status quo, as it was intended to avoid arbitrary decisions about whether a country could be considered infected or not. Moreover, the ISC provided guidelines on the management and responsibilities of the quarantine stations.

The ratification process was probably even more troubled than the ISC debates themselves. Only France, Portugal, and Sardinia ratified the convention. However, Portugal denounced its ratification after fourteen years. Overall, the ISC was defined by Howard-Jones (1975) as a "fiasco"[149] because of the lack of practical results. It is undeniable that the direct outcome of the ISC did not reflect its objective of creating a uniform sanitary regulation in the Mediterranean as most of the participating states returned to their original ways, keeping sanitary practices in the region as incoherent and jeopardized as before. However, it is essential to highlight that, for the first time, twelve powers worked together to attempt regulating health policies through international cooperation. Likewise, a more balanced opinion can be found in Hillemand & Ségal (2013), who affirmed that the ISC could be understood simultaneously as a success and a failure.

On the one hand, the ISC was an unprecedented moment in which different countries joined forces for the common interest. On the other hand, the lack of ratifications prevented a practical realization of what was agreed upon. Interestingly, the ISC allowed a medical and diplomatic response in which the two fields were equally represented for the first time, as the voting system of the conference proved. Overall, by being the pioneer of sanitary conferences, the ISC created the fertile ground over which the successive conferences and international agreements took place and laid a crucial first step toward a more globalized response against diseases.

[149] Howard-Jones (1975). *The scientific background of the International Sanitary Conferences, 1851-1938*. Geneva: World Health Organization, p.16.

2.6 OTHER RELEVANT INTERNATIONAL SANITARY CONFERENCES

After the first ISC of 1851, thirteen sanitary conferences followed. However, only a few of them produced noticeable results. Among those, the seventh ISC held in Venice in 1892 reached the remarkable outcome of adopting the first International Sanitary Convention. This chapter explores the goals and relevant outcomes of the ISCs and the historical context in which they were framed.

The second ISC took place once again in Paris in 1859. It aimed at amending the draft convention agreed on at the first conference. Only diplomats were allowed to take part to streamline the lengthy medical disagreement that took place during the first ISC. However, despite scientific advances on the origins and spreading methods of cholera, mainly thanks to John Snow and Filippo Pacini's publications, little attention was paid to them by delegates. The lack of consensus over diseases' origins and spreading methods fuelled the dualism between contagionists and anti-contagionists that eventually undermined the production of a satisfactory agreement. However, some interesting points arose. For example, delegates unanimously agreed on including local health authorities within an information network that allowed them to share relevant news directly, keep them "mutually informed",[150] and "without prejudices".[151]

It was also agreed on the increased inclusion of European physicians and medical inspectors in the Levant to allow a prompter reaction against diseases, a decision opposed by British and Turkish delegates. According to the Turkish delegates, local health institutions were remarkably improved and reached the same level as those in Southern Europe. Arguably, Turkish authorities may have felt that increased sanitary surveillance from external powers would damage their sovereignty. Eventually, no participating countries — the same as the first ISC, excluded the Reign of Two Sicilies — ratified the convention and Turkey and Greece refused to sign it.

Following the lack of practical results, a third ISC was held in Constantinople in 1866. It focused on cholera, the primary source of disagreement within the previous two ISC. The appointed committee cast some light on cholera, which resulted in agreement on several points and contrast in others. In the committee's report sent before the commission, cholera's origins and endemicity near the Ganges in Bengal were acknowledged, and humans were considered carriers, even though cholera's ways of transmissibility remained unclear. Water was thought to be a possible vector as it

[150] International Sanitary Conference (1859). *Protocoles de la Conférence sanitaire internationale ouverte à Paris le 9 avril 1859.* Paris: Imprimerie nationale, Séance du 12 juillet 1859, pp.4-5.
[151] Ibid, p.5.

could "contribute under certain circumstances"[152] to the spread of cholera, an assumption based on the studies of John Snow, even though he did not receive much attention from delegates. More attention was given to Pettenkofer's theory that the soil absorbed cholera patients' dejections, which mixed with bad air and eventually fuelled the epidemic. However, doubts remained whether merchandise could transmit cholera.

What was certain is that cholera was a transmissible disease that could be imported from abroad. In this regard, pilgrims were considered one of the prominent carriers of cholera. Their movements in India spread the disease across the country, and evidence proved that cholera periodically broke out following pilgrims' mass gathering in holy cities such as Mecca. Then, ports such as Alexandra spread the disease further through maritime trade. Huber (2006) affirms that significant contrast between the European powers — chiefly France — and the Muslim countries was linked to the sanitary measures against pilgrims. France suggested quarantining pilgrims in the Hedjaz or in the desert, which met a firm disproval from Ottoman and Persian delegates because of the "unequal treatment"[153] received. Overall, the author argues that the contrast between European and Muslim states became more evident.

The fourth ISC took place in Vienna in 1874, and the song remained the same. It was largely a review of the previous ISCs, and fundamental divergence about quarantine between Mediterranean countries except for France and northern countries persisted. Overall, some agreement on the transmissibility of cholera discussed by delegates was found. The ISC confirmed that the primary way of transmission of cholera was the air, and through it, it could attach to objects, even though fresh air could rapidly destroy its "morbific activity".[154] Of particular interest, the fourth ISC also proposed the establishment, which never materialized, of a permanent International Commission on epidemic diseases, composed of doctors chosen by the participating states and based in Vienna. Its first goal was to study cholera's ethology and prophylaxis, but other diseases like yellow fever were included. Additionally, it was proposed the establishment of an International Health Council in Persia to advance its public health conditions while providing an additional layer defending Europe from importable diseases.

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[152] International Sanitary Conference. (1867). *Report to the International Sanitary Conference of a commission from that body, to which were referred the questions relative to the origin, endemicity, transmissibility and propagation of Asiatic cholera.* (S. L. Abbot, Trans.) Boston: Alfred Mudge & son, p.83.

[153] Huber (2006). The Unification of the Globe by Disease? The International Sanitary Conferences on Cholera, 1851-1894. *The Historical Journal*, 49(2), p.463.

[154] International Sanitary Conference. (1874). *Procès-verbaux de la Conférence sanitaire internationale, ouverte à Vienne le 1 juillet 1874*. Vienna: Imprimerie impériale. p.381.

The fifth conference was held in Washington in 1881. It was conceived as a response to a recently adopted domestic law in the U.S.[155] that aimed to prevent the importation of diseases from abroad, mainly against cholera and yellow fever. The latter recently hit the U.S, particularly the southern states. The act prescribed that ships had to be inspected and assigned a bill of health with the required information over the health status of the port before sailing to the U.S, a provision that relied on foreign powers cooperation. Additionally, the U.S. government lamented the lack of an effective system capable of sharing sanitary information over the health conditions on the departure ports. Therefore, the main goal of the fifth ISC was to establish an effective "network of notification"[156] over sanitary matters. In this regard, public authorities had to notify the required information systematically to each other. It was proposed that two International Agencies of Sanitary Notification based in Havana and Vienna had to be established. The former was in charge of collecting sanitary information in America and the latter in Europe, Asia and Africa. Overall, as the WHO (1958b) study suggests, such a proposal highlights the increased importance of a specifically-designed international system of epidemiological reporting.

The sixth conference of Rome 1885 aimed at creating a general establishment of a system of "prevention, surveillance and isolation"[157] to contain diseases in their original places. Lack of scientific consensus over cholera perdured, even though Koch proved in 1884 that its causative agent was a bacillus. However, there was a sharp contrast between most European powers and Britain, as the formers attempted to offset the British's power and commercial superiority. A controversial topic was about the measures that had to be taken with the opening of the Suez Canal, which effectively opened a new passage for goods and diseases from India to Europe, overriding Egypt in controlling trade and diseases, as the British had effective control over the canal.

A breakthrough can be found in the seventh ISC held in Venice in 1892, as for the first time, an ISC produced an effective international. Following the previous ISC, only cholera was discussed, and the main topic remained the passage of ships and quarantine through the Suez Canal. Unprecedently, the scientific discussion reached a fundamental consensus thanks to a significant — yet not unanimous — acceptance of the germ theory that could finally explain cholera and its transmissibility. On these foundations, delegates agreed that British ships passing through the Canal

[155] On 2 June 1879 the U.S. Congress approved an Act "to prevent the introduction of contagious or infectious diseases into the United States". United States Government Printing Office. (1884). *Annual report of the National Board of Health. 1883*. Washington, p.29.
[156] International Sanitary Conference. (1881). *Proceedings of the International Sanitary Conference. Provided for by joint resolution of the Senate and House of Representatives in the early part of 1881*. Washington: Government Printing Office, p.5.
[157] Translated from French. *Protocoles et procès-verbaux de la Conférence sanitaire internationale de Rome, inaugurée le 20 mai 1885*. Rome: Imprimerie du Ministère des Affaires étrangères, p.5.

were to be inspected and classified in: (I) "clean", (II) "suspected", or (III) "infected", with different sanitary measures applying. Delegates also found common ground about the much-debated containment measures against cholera related to pilgrims in Mecca. However, the contrast between some European powers and Egypt arose in discussing the budget of the Health Council that ought to be reorganised, in which the formers aimed at pushing Egypt to contribute more economically. In this regard, Huber (2006) suggests that Europe – Levant relationship ambiguously shifted between "cooperation and exploitation".[158]

It is worthy of notice that the treaty was possible thanks to other talks that happened before the start of the ISC, such as the protocol signed by Austria-Hungary with Britain ensuring that British ships would be allowed to pass through the canal, in quarantine, regardless of their health status (Howard-Jones, 1975). Moreover, it is undeniable that technological advancement, especially the telegraph, exponentially improved information transfer, allowing a quick and reliable channel of transferring epidemiological news that essentially allowed the ISC's outcome. Finally, it must be noted that given the relatively small number of participants, fourteen states, reaching an agreement was a less challenging task compared to some of the previous ISCs.

The eight ISC in Dresden 1893 discussed, once again, mainly cholera and particular attention were given to sanitary measures other than maritime quarantine. Soon after the conference's opening, the German government proposed shifting from a quarantine regime to a system of medical inspection regarding trade and merchandise. Overall, disinfection assumed greater importance. Britain, for once, adopted a contagionist view and stressed the need to fight contagious diseases through "notification, isolation and disinfection".[159] A similar view was also shared by France and the United Kingdoms of Sweden and Norway, stressing the need for a reliable network of epidemiological information.

Unsurprisingly, an improved network of information was highly demanded to prevent the chaotic share of news during epidemics, such as the recently occurred cholera outbreak in Hamburg in 1892. The press in Britain rightfully accused Hamburg's authorities of having concealed the disease, which was eventually communicated by foreign consuls (Jackson, 2013). Furthermore, the ISC aimed at establishing a cap over the severity of measures taken against cholera in the participating states, but without forcing them to adopt specific measures. Overall, the conference attempted to reduce the state of anarchy which repeated itself during the cholera wave of the previous years. Eventually, eleven powers ratified the convention.

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[158] Huber, V. (2006, June). The Unification of the Globe by Disease? *The Historical Journal*, 49(2), p.468.
[159] International Sanitary Conference. (1893). *Protocoles et procès-verbaux de la Conférence sanitaire internationale de Dresde, 11 mars-15 avril 1893*. Dresden: B.G. Teubner, p.51.

The following ninth ISC of 1894 held in Paris re-examined the issue linked to the pilgrimage in Mecca, almost entirely avoided during the seventh and eighth conventions. Pilgrims were believed to fuel cholera epidemics in Europe, causing much concern, especially for Austria-Hungary, Britain, France and Russia, as they governed over significant numbers of Muslims. Despite that, Britain and India refused the proposal of leaving two square meters of space for each pilgrim on ships as prescribed by Art. XIII. As a result, many European powers refused such a proposal to avoid being forced to raise prices and get cut off from the profitable trade of pilgrims.

Interestingly, the contrast between France and Britain was highlighted by the accusations moved by the French delegate Monod against the British delegate, defined by Howard-Jones (1975) as a "carefully prepared attack".[160] Monod stressed that the export of cholera to Europe is essentially a British responsibility, as the "factory in which cholera is produced"[161] is in British India. However, cholera was also brought by European migrants travelling to the American continent, as stressed by the American delegation, but no ad-hoc measures were decided upon. Overall, the ninth ISC produced a third convention signed by thirteen countries.

The tenth ISC was held in Venice in 1897 and focused on the plague after a recent outbreak in India. Despite the lack of knowledge of the plague vector, there was a reasonable degree of consensus on how the disease was transmitted, for example, through rats. The tenth ISC stressed the need to ratify the previous ISCs that many powers did not, despite signing them. In this regard, the previous ISC was considered to have remained a "dead letter"[162] by the Austro-Hungarian delegate Lützow. Similarly, the eleventh ISC of Paris 1903, proposed by the Italian government, reviewed the previous ISCs' outcomes and merged them in one international convention, modifying them with the new scientific findings like the possible transmissibility of plague through rats' flee and the mosquito as a vector for yellow fever.

Of particular interest was the proposal to realise an international office that would gather relevant epidemiological information creating a more cohesive response. It is worth noting that a similar institution established in 1902 was already functioning in the American continent. Eventually, such an international office saw its realization in 1907 with the *Office international d'hygiène publique* (OIHP) established by the Arrangement of Rome. It was mainly concerned with cholera,

[160] Howard-Jones, N. (1975). *The scientific background of the International Sanitary Conferences, 1851-1938*. Geneva: World Health Organization, p.74.
[161] International Sanitary Conference. (1894). *Conférence sanitaire internationale de Paris, 7 février-3 avril 1894: procès-verbaux*. Paris: Imprimerie Nationale, p.96.
[162] International Sanitary Conference. (1897). *Conférence sanitaire internationale de Venise, 16 février-19 mars 1897: procès-verbaux*. Rome: Forzani & Co. Imprimeurs du Sénat, p.15.

plague, and yellow fever, even though it allowed the share of epidemiological information on a broader scale.

The twelfth ISC Paris 1911-1912 proposed standardized definitions of key terms like "healthy", "suspected", and "infected" vessels and attempted to make countries rely on protective measures according to official statements from other participating countries whether diseases were present on their territory. Such a measure required a degree of mutual trust that was not accepted by several countries, making the conference a dead letter until 1919. Additionally, they failed to give adequate importance to typhus fever, smallpox, and the role of rats in spreading the plague. According to Cumming (1926), the twelfth ISC's results were "illogical"[163] and "inconsistent with modern knowledge".[164]

During the inter-war period, the health section of the League of Nations was supposed to provide epidemiological intelligence, but it had little success. In doing so, the League of Nations was supposed to absorb existing international health institutions, such as the OIHP. However, the OIHP could not be moved under its control due to U.S.' opposition.[165] A new permanent office was established with a similar function to the IOHP: the Health Committee of League of Nations, under the League of Nations Health Organisation (LNHO). It resulted in a redundant double work to the point that a mixed committee was proposed without success and a "certain spirit of rivalry"[166] between the two health bodies existed.

It is worth noting that in the first half of the 20th-century international sanitary cooperation was no longer a strictly European-driven affair. Regional treaties were in function in the American continent and Asia. In the American continent, sanitary agreements were led by the U.S, which cast its sanitary sphere of influence in the region while adopting a distanced position from the League of Nations. Simultaneously, Asia provided its regional model and a certain degree of integration within the expanding network of epidemiological intelligence with a key role played by the Singapore Bureau. The African continent, fundamentally divided by imperial interests, lacked its own body of epidemiological reporting coupled with a general poor sanitary cooperation.

The ISC of Paris 1926 highlighted a substantial shift of attention from quarantine measures to a more effective epidemiological share of information. Within such a network, which was extended

[163] Cumming, H. S. (1926, October). The international sanitary conference. *American Journal of Public Health*, 16(10), p.977.
[164] Ibid.
[165] The U.S. were a member of the OIHP but not of the League of Nations. The U.S. government opposed to be part of an international body which was under the control of the League of Nations.
[166] Howard-Jones, N. (1975). *The scientific background of the International Sanitary Conferences, 1851-1938*. Geneva: World Health Organization, p.95.

to other diseases like typhus and smallpox, a crucial role was played by the IOHP (Sealey, 2011). An improved epidemiological surveillance system was possible thanks to the consolidation of the telegraph and radio signals. Additionally, the ISC gave particular attention to anti-cholera vaccines, standard rules for disinfection and de-ratification of ships, and screening of passengers at points of departure. The last ISC was held again in Paris and resulted in the dissolution of the controversial *Conseil sanitaire maritime et quarantenaire d'Égypte* (CSMQ), which Egypt has long perceived as a foreign intrusion against its national sovereignty (Chiffoleau, 2007).

Arguably, the ISCs promoted the administrative and diplomatic environment over which modern health institutions could be established. Despite the many failures, considerable success was achieved in shaping the idea that while the growing globalization of diseases favoured unexpected challenges, a global response could — and had to — be organized. However, it was not until the post-Wolrd War II that a major reorganization of health institutions occurred. In this regard, the International Health Conference opened in New York in 1946 was convened by the United Nations. It approved the Constitution of the WHO, arguably one of the most advanced tools favouring international cooperation.

Eventually, both the OIHP and the LNHO's functions were taken over by the WHO, which was officially established in 1948. Shortly after, in 1951, the WHO issued the International Sanitary Regulations, a single set of rules aiming at defending the world from the so-labelled "quarantinable diseases": cholera, plague, yellow fever, smallpox, relapsing fever and typhus. Eventually, the International Sanitary Regulations were revised and renamed in 1969 as the International Health Regulation (IHR). The 1969 IHR included cholera, plague, smallpox and yellow fever and made it mandatory for member states to notify the WHO of their presence within twenty-four hours through telegrams or telex (World Health Organization, 1969).

CHAPTER 3 INTERNATIONAL SANITARY COOPERATION: AT WHAT POINT ARE WE?

INTRODUCTION

This chapter looks into the dynamics of the international approach against diseases in more recent times. The time period considered includes the context of the Cold War, the current management of the COVID-19 pandemic and future challenges. This analysis starts after the establishment of the WHO, the most influential international organization promoting cooperation in the global and common fight against diseases. Thus, the examined period significantly differs from the one that characterized the origins and the initial evolution of sanitary cooperation until the first half of the 20th century. The past, early tentative approaches to establish cooperative instruments through a concert of conferences, conventions and institutions gave space to a more mature, representative, albeit not flawless, global system.

However, the much-needed leadership and the new tools to establish coordinated measures supporting public health provided by the WHO met unfavourable geopolitical constraints. The Cold War proved to be a substantial stress test on the international system and on the will of states to cooperate while pursuing competitive and destructive strategies against each other. In this regard, the Cold War confrontational narrative between the two superpowers, the U.S. and the U.S.S.R., is contradicting. Chapter 3.1 considers the successful smallpox eradication campaign, which was ideated, executed, and successfully concluded throughout the Cold War with the crucial support of the U.S. and the U.S.S.R. As the first part of this chapter exposes, on the one hand, there was the will to pursue international campaigns against diseases to the benefit of all. On the other hand, such campaigns were seen with mutual suspicions and often considered as tools to advance specific national strategic interests to the detriment of the rival power.

Chapter 3.2 moves forward to the following decade, the 1980s. In this period, the renewed Cold War tensions gave space to a more confrontational approach, which included the back-then recently discovered HIV/AIDS. This chapter demonstrates that AIDS was exploited through one of the most influential and elaborate disinformation campaigns ever conceived about epidemic diseases and effectively used a tool, inherently inserted within the Cold War context, to damage the enemy's image, credibility, and prestige. This chapter also exposes the role of the new technologies such as

the radio and television that considerably contributed to a more effective information network for epidemiological information and, simultaneously, as a tool to spread fake news.

The analysis continues with chapter 3.3, where certain critical aspects of the international response to the current COVID-19 pandemics are discussed. This chapter focuses on the role of the WHO and the global vaccination campaign under the COVAX program, exposing its success and raising awareness of certain crucial flaws. To this end, the concept of vaccine nationalism is introduced. The chapter continues its analysis by considering future threats to global health, introducing the most significant risk factors like biological warfare and other bio-threats such as the risk of pathogens leaking from laboratories and bioterrorism. Furthermore, climate change is addressed as it is considered one of the most impacting factors for the emergence of new infectious diseases that may lay at the origins of a future pandemic. The chapter ends with the present and future international tools that can be implemented to prevent and contrast more effectively future health emergencies.

3.1 COLD WAR AND DISEASE ERADICATION IN THE THIRD WORLD

The smallpox vaccination campaign during the mid-1960s and late 1970s can be considered a landmark of international sanitary cooperation. This chapter addresses how one of the major examples of international sanitary cooperation ultimately led to the eradication of an infectious disease for the first time in history. What is most interesting is that such an event took place during the precarious geopolitical scenario of the Cold War, typically characterized by superpowers competition. Even though the fight against smallpox started centuries before through variolation and vaccination campaigns, by the 1960s, the disease was still endemic in many parts of the world, particularly in the Global South. By the late 19th century and the early 20th century, more developed countries significantly reduced smallpox's incidence within their borders, mainly through mandatory vaccination. However, following World War I, the disease erupted in parts of Europe and the Soviet Union, lasting until the 1930s, only to return shortly after World War II. In this regard, international health bodies like the OIHP and the LNHO largely lost their functions during the conflict, and the share of epidemiological intelligence came to a halt.

The Global North could not consider itself utterly safe from smallpox, as a significant number of cases were imported annually from the rest of the world. Such a risk was also increased with the greater intensity of the movement of people fuelled by air travel. For example, the U.S.S.R was greatly concerned by smallpox endemicity in India, Pakistan, Iran, and Afghanistan. Furthermore, Soviet concerns over India's high smallpox incidence exponentially grew after an Indian traveller infected forty-six Muscovites in 1959 despite being vaccinated. Shortly after, the Soviet government dispatched a special medical team to fight smallpox in the subcontinent.

Likewise, Europe had a strong link with its former colonies in Africa, and the U.S. with Latin American countries. Japan experienced a significant number of cases of smallpox following the devastation of World War II. Consequently, industrial countries kept a costly routine vaccination for their population to reduce the risk of smallpox outbreaks. Still, complete safety from smallpox could only be achieved through a global response targeting underdeveloped and developing nations.

A proposal to start a worldwide smallpox eradication campaign came from the Soviet government during the eleventh World Health Assembly (WHA)[167] meeting in Minneapolis in 1958. The Soviet Health Minister Viktor M. Zhdanov argued that eradicating smallpox globally in only five

[167] The World Health Assembly is the legislative and decision-making body of the WHO. It is in charge of setting new goals and tasks. It also approves WHO's budget.

years was "technically feasible"[168] and assured U.S.S.R.'s full support and international commitment by providing knowledge-sharing and practical assistance. The U.S.S.R. highlighted the successful eradication of smallpox within its territory and its industrial plants to produce a sufficient supply of resistant dried vaccines that could be used in tropical countries without significant loss of effectiveness. According to the report provided by the U.S.S.R. at the meeting, a global campaign against smallpox was significantly supported by economic reasons, as the summed total cost of maintaining in place vaccines and prophylaxis measures in each country exceeded the cost of eradicating the disease globally.

The U.S.S.R.'s international commitment against smallpox, as suggested by Cueto et al. (2019), can also be framed as a Soviet move aimed at challenging U.S. prominent influence in the WHO and broader health affairs internationally. While several countries supported the Soviet proposal, the U.S. showed no enthusiasm. The U.S. was already committed to eradicating malaria domestically, in the Western Hemisphere through the Pan American Sanitary Bureau (PASB) and globally, with the Malaria Eradication Program (MEP) through the WHO. Additionally, the 1950s Cold War policy of containment did not create a favourable international scenario where active cooperation could occur. Indeed, the U.S. engaged in MEP in a period of stark competition with the U.S.S.R., and the U.S. administration, to a certain extent, perceived it as a tool to combat communism in the Third World.

The WHO launched the MEP in 1955, but it was fundamentally linked to U.S. leadership and funds (Siddiqi, 1995). The U.S. was prominently present in the Third World with ample funds for health initiatives, mainly through UN bodies, like the WHO. The U.S. preference of international bodies over direct bilateral aids can be explained by the will of the U.S. to improve its humanitarian image globally without arising suspicion by foreign countries of possible U.S.'s ulterior motives — that is, practising "world politics"[169] in the Third World — as explained by Henry C. Lodge, the U.S. representative to the UN.

In the 1950s, disease eradication and human welfare projects were closely linked with the Cold War rhetoric, and the MEP was no exception. Despite an initial opening to the Soviets, invited by U.S. President Eisenhower to "join with us in this great work of humanity",[170] there was no actual room for the U.S.S.R. to take part in it, and it remained a U.S. led project. That is unsurprising, as the U.S. allegedly used anti-malaria programs to contain Soviet aids expansion in the Third World and

[168] Translated from Russian by the WHO. World Health Organization. (1958a). *Official records of the World Health Organization No.87. Eleventh world health assembly*. Geneva: World Health Organization p.80.
[169] The Department of State Bulletin. (1957, October 07). 12th Anniversary of United Nations. *The Department of State Bulletin*, 37(954), p. 768.
[170] Eisenhower, D. D. (1958, January 9). *Annual Message to the Congress on the State of the Union*. Retrieved January 16, 2022, from The American Presidency Project: https://www.presidency.ucsb.edu/node/233817

counteract local anti-U.S. sentiments (Cleaver, 1977). Therefore, the MEP attracted a certain degree of Soviets suspicions.

Despite some initial success, by the mid-1960s, the MEP showed its limits. The primary tool for eradicating malaria was the extensive use of the controversial *Dichlorodiphenyltrichloroethane* (DDT) to reduce the *Anopheles* mosquito population. However, financial constraints and the resistance to DDT by some mosquitoes' species made clear that eradication was still a distant goal. In this context, the Soviet initiative against smallpox placed the U.S.S.R. in a key position in international health affairs, counterbalancing U.S. dominion. Following the increasingly poor result of the MEP, the eradication of smallpox became a more logical choice for several reasons: (I) there were far fewer cases of smallpox worldwide than malaria, and the virus spread relatively slow, (II) the vaccine was highly effective, with no controversial seatbacks like DDT, and (III) it was dramatically less expensive than eradicating malaria.

An opening from the U.S. to the eradication of smallpox came in 1965 from U.S. President Lyndon B. Johnson. That was no coincidence: the U.S. reputation and image abroad dramatically deteriorated due to the escalation of the Vietnam War. Henceforth, the U.S. needed to improve its worldwide image, and enhance its commitments in health affairs in the Third World was deemed a helpful approach. Such an opening inserts itself in a context of international relations between the U.S. and the U.S.S.R. characterised by increased stability, albeit still profoundly limited, that laid the foundations for the *détente* policy carried out during the 1970s by the Nixon administration. *Détente* allowed, to a certain extent, a cooperative approach among the superpowers in technical areas such as public health. Eventually, the WHA approved the Smallpox Eradication Program (SEP) in 1967.

Arguably, the SEP had a conflictual and often incoherent narrative in the Cold War rhetoric. On the one hand, the U.S. Johnson administration's support to SEP seemed to go beyond the antagonist narrative of the Cold War, stressing the relevance of cooperation at the international level. In this regard, already in 1964, Johnson affirmed that international cooperation, through U.S. leadership, was crucial to solving one of the problems that "menace men's welfare":[171] diseases. On the other hand, domestic narratives by some U.S. officials differed sensibly. One clear example is an administration document titled "*The United States and Worldwide Offensive against Disease*", as Manela (2011) reported. In such document, the poor areas of the world plagued by infectious diseases constituted a threat to the U.S. to the extent that:

[171] Lyndon, J. B. (1954, June 10). *Commencement Address at Holy Cross College*. Retrieved January 16, 2022, from The American Presidency Project: https://www.presidency.ucsb.edu/node/239455

"*The best breeding place for Communism is disease and poverty. If we are going to lead the free world in its fight against the bondage of Communism, we have to do something about the health of these poor people."*

Thus, the SEP was inserted not only in the double narrative of sanitary cooperation between the U.S. and the U.S.S.R. *despite* the Cold War, but also *because* of the Cold War. Indeed, the U.S. perceived it, to a certain extent, as a tool to win the superpower's confrontation. Such an interpretation certainly pleased the more intransigent anti-communists in the U.S. that wished a more U.S. hard-line and presence in the Third World to prevent communist infiltrations. Ironically, in such a view, the SEP would reduce Soviet influence in the Third World through Soviet assistance. Additionally, U.S. commitment to the SEP would have avoided leaving the Soviets to lead a likely successful program, gaining Third World support, while leaving the U.S. with the failing attempt to eradicate malaria. In this regard, the U.S. support to SEP could be framed, to a certain extent, as a U.S. reaction to an expansionist Soviet move, which would be consistent with the Orthodox view of the Cold War.[172]

It is important to note that the eradication of smallpox was coherent with the "Global Great Society" envisaged by Johnson for the U.S. and the rest of the world. Arguably, the fight against smallpox represented a significant step forward in building it (Reinhardt, 2010). Furthermore, as Cueto et al. (2019) argue, the U.S. perceived that the absence of certain diseases would fuel a capitalist-driven economy in the least developed nations. In this regard, the U.S. would have potentially profited from such an economic change by increasing the number of foreign consumers of U.S. goods and creating friendly political governments favourable to U.S. interests.

Despite being a Soviet initiative, the SEP was led by the American[173] Donald A. Henderson. Henderson gained Soviets' trust, overcoming strong opposition from the Deputy Health Minister of the U.S.S.R., Dimitri Venediktov, who argued that the Soviets were supposed to lead the project, as the SEP was one of their initiatives (Henderson, 1998). Henderson was also fully aware that ensuring the Soviets total commitment to the SEP was essential for its success due to its vaccine production facilities being unmatched by any other country. Mutual trust, therefore, was a prerequisite for the U.S.-U.S.S.R. collaboration to continue and for the SEP to be successful.

In this regard, the WHO played a crucial role in ensuring a satisfying degree of trust and compliance between the two superpowers by creating, to a certain extent, a "neutral space"[174] for technical cooperation to flourish. Mere technical cooperation was less likely to be manipulated for

[172] The Orthodox or "traditional" view considers the U.S. to have had a passive/reactive role, thus acting defensively.
[173] In this study the term "American" refers to the United States, with the sole exception when used within the names of international organizations which clearly refer to the plurality of American countries in the continent.
[174] Manela, E. (2010, April). A Pox on Your Narrative: Writing Disease Control into Cold War History. *Diplomatic History*, p.322.

reasons other than disease eradication. Henceforth, leaving the MEP to the greatest extent possible to technicians instead of diplomats ensured a satisfying degree of trust. In this view, the SEP was unlikely to be manipulated and used as a Cold War tool to fight communism.

However, the SEP was successful also in countries with bad relations or openly in contrast with U.S. ideals. Among those, there was India, which also accounted for most of the global smallpox cases. The government of Indira Gandhi — who had a considerably conflictual relationship with U.S. President Nixon — established friendly ties with the U.S.S.R., which was also the first arms supplier to India. Despite political tensions, the SEP was successfully implemented. Similarly, the SEP continued to work in several African states that experienced socialist governments. For example, Ethiopia and Somalia experienced a Marxist military regimes takeover during the 1970s. Yet, the SEP continued and finally eradicated the last naturally transmitted endemic case of smallpox, which was reported in October 1977 in Somalia. Likewise, several communist regimes had close ties with the U.S.S.R. like China and Cuba (Visentini, 2020), yet the SEP was still thriving. In several countries, vaccinators — the most significant part of them were hired from the local population — had to overcome local resistance and conflicts, such as the Nigerian and Bengalese civil wars.

Interestingly, the SEP thus proved that technical cooperation in health affairs could be achieved despite political rivalries. Eventually, smallpox was officially declared eradicated during the thirty-third WHA on 8 May 1980. The WHA considered it an "unprecedented achievement in the history of public health"[175] achieved through collective action from all countries, demonstrating that "nations working together in a common cause may further human progress".[176] Consequently, with the following thirty-fourth WHA held in 1981, the IHR were further revised to exclude smallpox (World Health Assembly, 1981).

[175] World Health Assembly. (1980). *Declaration of global eradication of smallpox*. Geneva: World Health Organization. Retrieved January 16, 2022, from https://apps.who.int/iris/handle/10665/155528
[176] Ibid.

3.2 COLD WAR AND THE AIDS DISINFORMATION CAMPAIGN

The closing of the 1970s and the turning to the new decade marked a new Cold War phase. The Soviet invasion of Afghanistan in 1979 finally ended *détente*, and the election of U.S. President Ronald Reagan confirmed a major change in U.S. foreign policy. Cold War tensions raised dramatically, and the timid space for cooperation, at least in technical areas, that characterized the previous decade was largely put aside. The eradication of smallpox concluded successfully, yet international health affairs suffered the renewed tensions between the U.S. and the U.S.S.R. In this regard, the disinformation campaign about the Acquired Immunodeficiency Syndrome (AIDS) supported by the Soviets intelligence during the 1980s is a useful example of such a new Cold War climate.

The renewed Cold War tensions were, to a great extent, due to the Reagan administration's military build-up program, which focused on the Strategic Defence Initiative (SDI). The SDI required massive investments, particularly in high-tech, a field in which the U.S. had a comparative advantage. Henceforth, the SDI was intended to force the Soviets to spend a disproportionate amount of money to keep up with the arms race. The U.S.S.R. was not in the economic position of another round of arms race, given the overstretch of the 1970s and its poor economic performance of the 1980s. In the 1970s, oil prices sky-rocketed, which allowed the U.S.S.R. to earn massive money as it was the world's largest oil and natural gas producer. A similar fortune was enjoyed by Arab oil exporters, which translated into massive purchasing of Soviet military products, which further improved the U.S.S.R.'s gains. However, with oil prices plummeting by sixty-nine per cent in the 1980s, the Soviets faced a period of economic crisis (Kotkin, 2003).

Therefore, the AIDS disinformation campaign took place in a climate of intense Cold War tensions. It was part of a border set of disinformation campaigns conceived by the Soviets: the so-called "active measures" that mainly dealt with psychological warfare. According to the former KGB spy Yuri Bezmenov, "active measures" were intended to:

> "*Change the perception of reality of every American, to such an extent that, despite their abundance of information, no one is able to come to sensible conclusions in the interest in defending themselves, their families, their community, and their country.*"[177]

[177] Ellick, A. B., & Westbrook, A. (2018, November 12). *Meet the KGB Spies Who Invented Fake News*. Retrieved January 29, 2022, from The New York Times: https://www.nytimes.com/video/opinion/100000006210828/russia-disinformation-fake-news.html

The active measures exploited the numerous incertitude over AIDS's nature and origins to serve U.S.S.R.'s interests. In this regard, the Soviet disinformation campaign was based on pre-existing rumours circulating in several countries. According to the former spy of the Soviet State Security Committee (*Komitet Gosudarstvennoy Bezopasnosti*, KGB) and naturalized American after defecting to the U.S. Larry Martin (formerly known as Ladislav Bittman), "disinformation" can be defined as "deliberately distorted information that is secretly leaked into the communication process in order to deceive and manipulate".[178] Disinformation about AIDS was used starting from the early 1980s, as the disease's discovery rapidly became a controversial and sensitive topic in public opinion. Even though the disease's causative agent was found in 1983, its origins remained debated among scientists.

In the context of such a controversial public debate, the KGB exploited the situation and led the AIDS disinformation campaign. The campaign was further advanced by other Soviet-allied secret services, most prominently in Bulgaria through the Committee for State Security (*Komitet za dăržavna sigurnost*, KDS) and the East German Ministry for State Security (*Ministerium für Staatssicherheit*, MfS). Eventually, the MfS referred to the coordinated disinformation campaign with the codename "Operation Denver", as reported in a declassified document from the foreign intelligence branch of the MfS dated 3 September 1986.[179] The codename of the campaign itself created a certain degree of confusion and, ironically, of misinformation. Indeed, the AIDS disinformation campaign is mistakenly known worldwide as "Operation Infektion", which is incorrect (Selvage & Nehring, 2019) and refers to a different Soviet operation unrelated to AIDS. The campaign was part of a more extensive effort by the Soviet intelligence to discredit and damage the U.S. image internationally through covert actions. The objective of the campaign was exposed in a disclosed document dated 7 September 1985, in which the KGB sought support from the KDS, stating that:

> "The goal of these measures is to create a favourable opinion for [the Soviets] abroad that this disease is the result of secret experiments with a new type of biological weapon by the secret services of the USA and the Pentagon that spun out of control."[180]

[178] Ibid.
[179] Committee for Disclosing the Documents and Announcing the Affiliation of Bulgarian Citizens to the State Security and the Intelligence Services of the Bulgarian National Army (CDDAABCSSISBNA-R). (n.d.). Division X of the Hauptverwaltung Aufklärung (Hva/X) of the MfS, *Plan for common and coordinated active measures of the intelligence organs of the MOI of the PR Bulgaria and the MfS of the GDR for 1987 and 1988*. f. 9, op. 4, a.e. 670, p. 112. Obtained by Christopher Nehring and translated by Douglas Selvage. Retrieved January 24, 2022, from Wilson Center: https://digitalarchive.wilsoncenter.org/document/208947
[180] Committee for Disclosing the Documents and Announcing the Affiliation of Bulgarian Citizens to the State Security and the Intelligence Services of the Bulgarian National Army (CDDAABCSSISBNA-R). (1985, September 07*). KGB,*

According to the same document, AIDS was the "result of yet another Pentagon experiment with a new type of biological weapon".[181] It is worth noting that international law severely prohibited chemical and biological weapons, as analysed in chapter 3.4. It was not the first time that the U.S. was accused of using biological weapons during the Cold War. Indeed, the U.S. received accusations from China and North Korea of using germ biological weapons during the Korean War (Bruwer, 2001). Similarly, The U.S. accused the U.S.S.R. of supplying poisonous chemicals to its communist allies in South Asia and during combat operations in Afghanistan, commonly referred to as "Yellow Rain". However, such alleged "attack" was likely of natural origins instead of military action (Tucker, 2001). In both cases, the accusation was denied by the respective governments. Most importantly, the AIDS campaign could also be considered as a justification for the Soviets' biological warfare research widely carried out within its borders, in contrast with the international law and at risk of being exposed to the public (Geissler & Sprinkle, 2019).

The Soviet involvement in the AIDS disinformation campaign is supported by considerable evidence. For example, the head of foreign intelligence, Yevgeny Primakov, confirmed that the KGB spread fake news over an alleged U.S. military experiment from which the virus leaked, as the *Boston Globe* reported in 1992. According to the article, the KGB designed the story to expose the "perfidious"[182] U.S. scientific experiment. With KGB's support of the story, the conspiracy theory expanded globally. A multitude of actors contributed to the spread of conspiracy theories about AIDS, and many of those were driven by different motives. As Selvage (2019) suggests, some were under the influence of Soviet intelligence, others genuinely believed in it and aimed to spread awareness on the topic (therefore spreading misinformation and not disinformation), others to obtain personal gains and, in some cases, a combination of those factors occurred.

The start of the AIDS disinformation campaign can be traced with the publication of a letter in the pro-Soviet Indian newspaper *Patriot* in 1983 titled "*AIDS may invade India*". In the letter, the "mysterious disease"[183] resulted from U.S. experiments in order to "develop new and dangerous biological weapons"[184] aiming at infecting developing nations whose governments were "pliable to Washington's pressures and persuasion".[185] Following such a theory, AIDS could be framed as an

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Information Nr. 2955 [to Bulgarian State Security]. f. 9, op. 4, a.e. 663, pp. 208-9. Obtained by Christopher Nehring and translated by Douglas Selvage. Retrieved January 24, 2022, from Wilson Center: https://digitalarchive.wilsoncenter.org/document/208946

[181] Ibid.

[182] Reuters. (1992, March 19). KGB planted story tying US to AIDS. Russian says. *The Boston Globe*, p.2.

[183] AIDS May Invade India. (1983, July 17). *Patriot*, p.1. Retrieved January 23, 2022, from https://archive.org/details/1983-07-16-patriot

[184] Ibid.

[185] Ibid.

imperialistic move from the U.S. to assert the Third World's will. According to the anonymous[186] letter, blood donations imported from the U.S. were likely the cause of infections in Britain and other several countries.

Additionally, the article dug deeper into Indians' fears, suggesting that U.S. military experiments with AIDS may be moved to Pakistan and spread to India. Pakistan was a historical foe to India and a U.S. ally, from where the U.S. sent aid to support the *Mujaheddin* in Afghanistan to contrast U.S.S.R.'s occupation. However, the *Patriot*'s article was not successful in attracting considerable attention from the locals, and it remained an isolated case, most likely because AIDS was not considered a significant issue in the Third World during the early 1980s (Spetrino, 1998). Eventually, AIDS spread further and became a global issue and the Soviets re-attempted to renew the disinformation campaign two years later.

The conspiracist story identified the controversial U.S. military laboratory of Fort Detrick as the birthplace of AIDS/HIV. In addition to Soviet's media and diplomatic channels, European and Latin American press shared the story on a broad scale, eventually reaching most countries. As Spetrino (1998) reports, Soviet propaganda claimed that AIDS was essentially a Westerner issue and not a U.S.S.R's one, which likely concealed the real numbers of HIV-positive individuals. The campaign was reinforced using as "evidence" U.S. sources and controversial past U.S. biological warfare programs. Overall, the campaign continued to be successfully broadcasted in the Third World, mainly under heavy Soviet influence. The share of fake news in the Third World was highly effective as the KGB could count on several editors that could be easily bribed. Influential Western media also shared the false story like the *Sunday Express* in the U.K. and the *CBS News* in the U.S.

Among the main actors that fostered the disinformation campaign were the scientists Jakob and Lili Segal. It is unclear to what extent they operated autonomously or under the influence of Soviet intelligence. As Boghardt (2009) suggests, the Segal received forged information with the involvement of the MfS, either directly or through Segal's colleagues. Eventually, despite the scientific consensus merging toward the natural origins of the disease, the Segal zealously continued and developed their theory and dismissed the more widely accepted theory of a zoonotic spillover derived from monkeys as a "legend".[187] In their main work *AIDS – Its Nature and Origin*, Seagal et al. (1986) suggested that AIDS was created in Fort Detrick following experiments with infectious

[186] Ibid. The newspaper claimed that the author wished to remain anonymous, and the only information provided to the readers was that it came from a "well-known American scientist and anthropologist".
[187] Segal et al., (1986). *AIDS—Its Nature And Origin*, p.18.

pathogens carried out on volunteer subjects, primarily drug addicts and homosexual inmates, which allegedly took place in 1977.

The authors argued that the prisoners were released after no significant symptoms were shown. Eventually, the USA purportedly became a spreader of the disease through infected blood transfers and military personnel. The authors connected the presence of U.S. military bases with an increased rate of infections within the local population. In this regard, the authors provided the example of the U.S. Air Force military base in Aviano and the higher incidence of AIDS in the nearby Pordenone. The alleged link between AIDS and U.S. military bases and troops was consistent with the KGB's active measures in creating anti-American sentiments in the Third World and NATO countries, as exposed in an archival document sent from the KGB to the KDS.[188] Additionally, it can be considered as a strategic move to generate pressure and hostility against the expansion of NATO and push for a removal of existing military installations.

Interestingly, there was a stark contrast between a portion of the scientific community within the U.S.S.R. and the disinformation campaigns carried out by Soviet media. Among the experts, Zhdanov, who suggested starting the eradication campaign against smallpox a decade earlier, concluded that there was no evidence that AIDS had artificial origins and that the disease's aetiology remained unclear. Zhdanov publicly supported the theory that ADIS originated in Central Africa, where he believed it existed in endemic form and strongly opposed the idea that the U.S. developed the virus. Likewise, the chief specialist of infectious disease of the U.S.S.R. Ministry of Health, Valentin Pokrovsky, dismissed the idea that AIDS was man-made (U.S. Department of State, 1987).

The AIDS disinformation campaign penetrated the U.S. sphere of influence in the Western Hemisphere, where the Soviets mostly used left-wing and communist government-controlled newspapers in several Latin American countries. For example, Nicaragua received significant Soviet aid and served as an outpost in Central America to expand Soviet influence in the region. Furthermore, other minor disinformation campaigns were carried out through *Radio Peace and Progress* and the Soviet press during the mid-1980s. It is important to note that the active measures were not limited to AIDS but included, albeit considerably more limitedly, other diseases as well. For example, it involved different infectious diseases like haemorrhagic fever, dengue, encephalitis, conjunctivitis, and yellow fever allegedly spread by the U.S. in Korea, Cuba, Nicaragua and El Salvador.

[188] Committee for Disclosing the Documents and Announcing the Affiliation of Bulgarian Citizens to the State Security and the Intelligence Services of the Bulgarian National Army (CDDAABCSSISBNA-R). (n.d.). KGB, *Information Nr. 2742* [to Bulgarian State Security]. f. 9, op. 4, a.e. 675, pp. 156-9. Obtained by Christopher Nehring and translated by Douglas Selvage. Retrieved January 24, 2022, from WIlson Center: https://digitalarchive.wilsoncenter.org/document/208948

To a great extent, the AIDS disinformation campaign involved the Third World. The Seagal's work circulated in African conferences, such as the Non-Aligned Movement summit held in Zimbabwe in 1986, where a brochure titled "*AIDS: USA home-made evil, NOT imported from AFRICA*" was distributed to the delegates (Selvage & Nehring, 2019). Additionally, Soviet information broadcasters like *Novosti Press Agency* and *Radio Moscow* supported the local press in several African countries to further spread the story, with considerable success. The disinformation campaign was integrated with additional content specifically targeting the African audience. It claimed that the U.S. expanded its scientific experiments of biological warfare research on Africans and that a biological weapon targeting the black population was being developed.

The concept of an "ethnic weapon" suggested a close partnership between the U.S., South Africa, and Israel in spreading a virus that would be harmless to whites and deadly for anyone else. Such news was shared by *Novosti* and broadcasted with considerable success in the Third World. Interestingly, as Synder (1995) reports, the senior editor of *Novosti* Valentin M. Falin was confronted on the topic by the director of the U.S. Information Agency (USIA), Charlie Wick. Falin defended the story, which in his opinion appeared to be "pretty logical"[189] given the "U.S. treatment of American Indians, putting smallpox blankets on them".[190]

The U.S. did not remain silent and invested considerable efforts in contrasting the disinformation campaign. Henceforth, the superpowers' dualism also translated into a fight against the enemy's spread of false news. The U.S. government employed several institutional bodies to counter the Soviet campaign by publishing research and making it available to the public. In that way, false news was challenged by factual and reviewed information. Among the leading U.S. bodies undertaking such a task were the Department of Health and Human Services, the Department of State, and the USIA. The latter two relied on a relatively small ad-hoc team known as the Active Measures Working Group (AMWG), which paled in terms of funds and working force compared to the resources mobilized by the KGB working on the disinformation campaign.

Official diplomatic channels were also used to display U.S. disapproval about the topic. Several U.S. ambassadors wrote complaint letters to the editors of Soviet media, with little success. Often, editors pretended to be unaware of the disinformation campaign nor that they had ill intention to discredit the U.S. The disinformation campaign was publicly denied also by chief Soviet officials.

[189] Snyder, A. A. (1995). *Warriors of disinformation: American propaganda, Soviet lies, and the winning of the Cold War: an insider's account*. New York: Arcade Publishing, p.116.
[190] Ibid.

For example, the Soviet ambassador to Washington denied that his government was playing any role in the campaign and downplayed its coverage within the U.S.S.R. by the local press (Gillette, 1987).

Moreover, as reported by the U.S. Department of State (1987), during the U.S.-U.S.S.R. Joint Health Committee of 1987 in Washington, U.S. chief delegates accused the Soviets of using a public health issue for propaganda purposes. They warned them that international cooperation was unlikely to happen had the disinformation campaign continued. Overall, sanitary cooperation was ensured by the WHO, which was not exempt from critics about its alleged politicization. As it was exposed in the previous chapter, the WHO plays a fundamental role in guaranteeing a neutral space that ensures cooperation in technical areas. However, effective cooperation is compromised when countries perceive that the WHO lacks neutrality.

For example, Hamerman (1985a) published in the controversial *Executive Intelligence Review* (EIR) an article titled "*The Soviets are covering up the deadly AIDS pandemic*", accusing the WHO of being under Soviet control. The author argued that several top positions at the WHO that dealt with infectious diseases — and therefore, AIDS — were controlled by the Soviets acting against U.S. interests. In this regard, Hamerman (1985a) looked with suspicion at high-rank officials within the WHO, like the Assistant Director-General S. K. Litvinov and the head of the Virus Diseases Sub-Division T.A. Bektimirov, as they reported to their superior Deputy Minister of Health Y. Chazov, who was a member of the Communist Party Central Committee. Likewise, the author claimed that the WHO collaborator R. M. Khaitov was "actively engaged in the recent period of disseminating deliberate disinformation on the nature of AIDS".[191]

Hamerman (1985b) firmly believed that the WHO, in partnership with the KGB, posed a threat to the U.S. national security and aimed at reducing parts of the world population. The author concluded that the West, which risked being crippled by the Soviets through the pandemic, should declare a "fullscale global war on AIDS".[192] Arguably, in what ways such a global response against the disease could have been possible without the active engagement of the WHO remains dubious. A response to Hamerman (1985a)'s article was published by the Soviet newspaper *Literaturnaya Gazeta* with an article titled "*Panic in the West, or What is Hiding behind the Sensation Surrounding AIDS*", written by Valentin V. Zapevalov. The author cited the *Patriot*'s story and denounced the

[191] Hamerman, W. J. (1985a, October 25). The Soviets are covering up the deadly AIDS pandemic. *Executive Intelligence Review*, 12(42), p.27.
[192] Ibid, p.36.

U.S. responsible for the pandemic, also claiming that creating a deadly virus like AIDS in a laboratory was technically possible.

Interestingly, Zapevalov criticised the EIR for having close ties with the Central Intelligence Agency (CIA) and that Hamerman (1985a)'s article was "nothing else than a clumsy attempt at covering up tracks".[193] Indeed, the EIR's editor and founder, LaRouche, had some documented contacts with CIA's officials. Still, it is unclear whether the journal had any real ties with the U.S. secret services, as Mintz (1985) reported. What is certain is that the Soviet *Literaturnaya Gazeta* often published news under KGB suggestions as exposed by one of KGB's agents Oleg Kalugin that referred to the newspaper as KGB's "prime conduit in the Soviet press for propaganda and disinformation".[194]

The EIR also published Seale (1985)'s sensationalist views. The author argued that even though the Soviets did not create the virus, they would use it to their advantage. The author claimed that AIDS would severely weaken NATO forces to the point of letting the U.S.S.R. gain the upper hand. In his view, an authoritarian state like the U.S.S.R. would shield itself from the disease behind the Iron Curtain while simultaneously promoting risky behaviours in the West, like drugs abuses and sexual promiscuity. In his opinion, AIDS was "less messy and self-destructive than using nuclear weapons",[195] allegedly used by the U.S.S.R. to reach "world domination"[196] by the year 2000. Such a view would suggest the existence of a plan conceived by the Soviets to exploit a naturally arisen pandemic to their geopolitical advantage, promoting its spread into antagonists' territories while simultaneously protecting itself behind closed borders.

Despite the critics about its alleged lack of neutrality in managing the AIDS response, the WHO provided a great degree of international cooperation. In concert with the CDC, the WHO organised the first International AIDS Conference held in Atlanta in 1985, the first of many conferences and seminaries on the topic. During the 1980s, the WHO launched a global response primarily through: (I) the exchange of epidemiological information and expertise between the WHO itself and other members, (II) raising awareness on the topic through the distribution of informative materials and manuals, (III) ensure the commercial availability of antibody tests, (IV) cooperate with member states in developing national programs, (V) provide expertise to states on the provision of safe blood and related products, (VI) promote research and scientific knowledge on therapeutic measures and the

[193] Executive Intelligence Review. (1985, November 22). Text of admissions by the Russians. *Executive Intelligence Review*, 12(46), p.9.
[194] Kalugin, O. (2009). *Spymaster: My Thirty-Two Years in Intelligence and Espionage against the West.* New York: Basic Books, p.178.
[195] Seale, J. (1985, October 18). AIDS and the security. *Executive Intelligence Review*, 12(41), p.54.
[196] Ibid.

development of a vaccine, and (VII) coordinate clinical trials of AIDS treatment drugs (World Health Organization, 1986).

Furthermore, health cooperation involved the East Block, the U.S.S.R. and the U.S. For example, in the German Democratic Republic (GDR), the first infected patients were diagnosed in 1987, causing growing concern within the government. The communist party and the Ministry of Health dismissed the man-made AIDS theory coming from the U.S. Henceforth, as Geissler & Sprinkle (2019) reported, the GDR cooperated with Western countries, including the U.S. In the U.S.S.R., a breakthrough over the AIDS campaign occurred during the meeting between the U.S. Secretary of State George P. Shultz and Soviet President Mikhail S. Gorbachev on 23 October 1987.

During the meeting, among many issues, Shultz openly accused the U.S.S.R. to spread false stories over AIDS, and the AMGW's second annual report titled "*Soviet Influence Activities: A Report on Active Measures and Propaganda, 1986–1987*", which Gorbachev already read it brought enough proof. Gorbachev did not deny Soviet involvement on the topic and pledged to stop the disinformation campaign. A week later, the false AIDS story was finally disavowed by the official government's newspaper *Izvestiya* (Geissler & Sprinkle, 2013). Such an official repudiation by the U.S.S.R. can also be framed as an attempt to avoid undermining the ongoing talks about nuclear disarmament, especially the upcoming meeting between Gorbachev and Reagan held in Washington on 8 December 1987 which produced the Intermediate-Range Nuclear Forces Treaty.

Overall, the author of this work finds it interesting that, on the one hand, the 1980s experienced one of the most influential and well-implemented disinformation campaigns about an infectious disease. On the other hand, the public health system oversaw by the WHO in concert with bilateral agreements guaranteed a certain degree of technical sanitary cooperation despite an unfavourable geopolitical environment. Following the dissolution of the U.S.S.R., the U.S. considered the problem of disinformation campaigns to be over. An assumption made with perhaps too much optimism, as disinformation campaigns are systematically carried out up to the present day primarily through the internet, which, ironically, contributes dramatically to making fake news go viral.

3.3 INTERNATIONAL RESPONSE TO COVID-19: WHO AND COVAX

COVID-19 is an infectious disease caused by the SARS-CoV-2 virus, first discovered in 2019. While most people experience mild to moderate illness without requiring special treatments, some develop severe symptoms, thus requiring medical attention and possibly hospitalization. The virus spreads mainly through droplets from the mouth or the nose of an infected person when coughing, sneezing, speaking or simply breathing. The virus's contagiousness can change over time following frequent mutations that may develop into different variants. As exposed in chapter 1, the disease's origins remain unclear even though similar coronavirus strains are found in certain animal hosts. However, despite extensive tests on animal populations, the specific reservoir species has not yet been identified. While the risk of transmission from animal to human is considered "low",[197] strict measures were applied in some instances, which led to the culling of animals.[198] Furthermore, many countries relied on the isolation of infected individuals and national lockdowns to reduce the virus's spread and slow down the curve of infections.

Despite remarkable achievements in establishing an effective system of international cooperation in health matters during recent times, the COVID-19 pandemic provided a significant stress test on the system and exposed its limits. The present-day interconnectedness of countries and the globalization of world markets have reached unprecedented levels since the previous major pandemics considered in this study. Today's interconnectedness and globalization are matched by an integrated system of public health, which was not available during the previous decades. Therefore, it is unsurprising that since the early onset of the COVID-19 pandemic, scholarly opinion urgently called for effective international cooperation to tackle the health emergency (Kokudo & Sugiyama, 2020).

Nowadays, individual countries can count on a system of public health not limited to a few leading institutions such as the WHO but also on a significant number of smaller organizations that cover different areas over which cooperation — and competition — is possible. Following the increasing constraints on the WHO, mainly over its budget, several states contributed to establishing numerous multilateral organizations working on narrows and specific topics, like the GAVI Alliance and the Global Funds to fight AIDS, tuberculosis and malaria. Thus, the present international sanitary

[197] Centers for Disease Control and Prevention. (2022, January 5). *Animals and COVID-19*. Retrieved February 1, 2022, from Centers for Disease Control and Prevention: https://www.cdc.gov/coronavirus/2019-ncov/daily-life-coping/animals.html

[198] Denmark reportedly killed seventeen million minks in November 2020 and Hong Kong announced to euthanize about two-thousand hamsters.

system on health matters is far more complex than ever, allowing more space to establish effective coordinated practices.

3.3.1 International law framework and the role of the WHO

As prescribed by the IHR, revised and adopted in 2005, a disease considered a Public Health Emergency of International Concern (PHEIC) must be notified within 24 hours. According to the WHO, a disease can be considered a PHEIC when the following conditions are met: (I) seriousness of the public health impact of the event, (II) unusual or unexpected nature of the event, (III) potential for the event to spread internationally, and (IV) travel or trade restriction may result because of the event. Even though there is no enforcement mechanism to impose the IHR, non-compliance would be "punished" by unilateral measures from other countries, like trade or travel bans, that can be avoided, or at least, make them less impacting, by following the guidelines of prompt notification of a possible PHEIC to the WHO.

Officially, the first cases of viral pneumonia were reported on 31 December 2019 by the Wuhan Municipal Health Commission. The WHO collected the information on the same day, and on the following day, it initiated its emergency response through the Incident Management Support Team. Shortly after, the news about the novel virus was shared officially with the WHO network of the Global Outbreak Alert and Response Network which ensures rapid access of experts and resources on-site, implementing a coordinated technical action following an outbreak. Local authorities in China formally informed the WHO on the 3 January, which, on the following day, spread the news globally through its social network page on Twitter warning of a "cluster of pneumonia cases —with no deaths".[199]

Local health measures, risk assessment, number of reported cases, and clinical conditions were reported formally through the IHR network, accessible by all member states on 5 January. Simultaneously, news of the disease was published on the WHO's website through its Disease Outbreak News reporting the first infected individuals who had a link to the local seafood market. According to local authorities, there was "no evidence of significant human-to-human transmission".[200] Yet, the Taiwan Centers for Disease Control (TCDC) sent an e-mail on 31

[199] World Health Organization. [@WHO] (2020, January 4). *#China has reported to WHO a cluster of #pneumonia cases —with no deaths— in Wuhan, Hubei Province CN. Investigations* [Twitter]. Twitter. Retrieved February 1, 2022, from Twitter: https://twitter.com/WHO/status/1213523866703814656?s=20

[200] World Health Organization. (2020, January 5). *COVID-19 - China*. Retrieved February 1, 2022, from World Health Organization: https://www.who.int/emergencies/disease-outbreak-news/item/2020-DON229

December to the WHO implying, albeit not explicitly, that the virus could be contagious since local cases were "isolated for treatment".[201] The disease's contagiousness was also suggested because Chinese authorities referred to the disease as "atypical pneumonia"[202], a term used for the 2003 epidemic of Severe Acute Respiratory Syndrome (SARS). Eventually, in a press conference on 14 January, the WHO stated that limited human-to-human transmission was "certainly possible".[203] Evidence on COVID-19 transmissibility between humans was found during the on-the-ground WHO mission, resulting in an official statement published on 22 January. On 24 January, the first COVID-19 cases in Europe were reported by France, all imported from China. On 30 January, the novel coronavirus was declared a PHEIC and, by 11 March, a pandemic.

Such coverage exposes the rapidity with which epidemiological news travelled. However, despite technical guidelines, a general lack of scientific consensus persisted during the early period of the health crisis, which, as extensively exposed in the previous chapters, is crucial for an effective and cohesive international response. Arguably, the international response against the COVID-19 pandemic, especially during the first year, was predominantly uncoordinated, which severely undermined an effective approach to prevent the spread of the disease from China, its birthplace, to other countries, and eventually reaching most of the world. Several countries adopted highly different domestic practices against the disease. Most notably, the U.S., U.K., and Brazil distinguished themselves for their initial inactive and denial rhetoric. In this regard, Pevehouse (2020) points to their populist governments as a possible explanation of their approach, at least during the initial phase of the health crisis.

Whether Chinese local authorities provided the quick share of information with the WHO as required by the IHR during the early stage of the outbreak remains unclear. Initially, the General Director of the WHO officially praised China for its "cooperation and transparency"[204] and for sharing the virus's genetic sequence with the WHO. As mentioned before, the WHO has no means to enforce transparency or arbitrarily obtain the information from local sources; thus, it must rely on the willingness of member states to cooperate and comply with international law.

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[201] Taiwan Centers for Disease Control. (2020, April 11). *The facts regarding Taiwan's email to alert WHO to possible danger of COVID-19*. Retrieved February 1, 2022, from Taiwan Centers for Disease Control: https://www.cdc.gov.tw/Category/ListContent/sOn2_m9QgxKqhZ7omgiz1A?uaid=PAD-lbwDHeN_bLa-viBOuw

[202] Ibid.

[203] United Nations. [@UNGeneva] (2020, January 14). *There are many similarities to SARS and MERS. The experience that we have with SARS and with MERS, the experience* [Twitter]. Retrieved February 1, 2022, from Twitter https://twitter.com/ungeneva/status/1217146107957932032

[204] Ghebreyesus, T. A. [@DrTedros] (2020, January 23). *I thank the Government of #China for its cooperation and transparency. The government has been successful in isolating and sequencing* [Tweet]. Retrieved February 1, 2022, from Twitter: https://twitter.com/drtedros/status/1220421162251051008

The WHO and Chinese authorities received critics to have allegedly downplayed the seriousness of the health crisis to the point that Lawrence Gostin, a global health professor at Georgetown University and WHO assistant, felt "deceived".[205] Huang (2020) reports that Gostin also claimed that China shared with the WHO information about the outbreak with a delay of two-six weeks, even though local authorities knew about the virus circulating in December, hence in contrast with the IHR.

Yet, it is debatable whether the WHO genuinely believed they were receiving updated information, or, as suggested by *The Associated Press* (2020), it flattered Chinese health authorities only to obtain more information. Moreover, there was a possible delay in sharing essential information such as the virus' genome, which was first sequenced in several Chinese laboratories and only made public several days later. Henceforth, doubts were also cast over the information available to determine the virus' origins. The task of determining the virus' origins and collecting more ground data was assigned to a WHO team of experts who arrived in China in 2021.

However, according to WHO team member Dominic Dwyer, Chinese authorities refused to share raw data about the first detected cases, which allowed space for speculation over the origins and the size of the initial outbreak, as reported in an article by Goh (2021). The WHO investigation team's effectiveness may have also been undermined by local health restrictions, as the visits to specific places were strictly planned and organized by Chinese officials, and contacts with community members were not possible.

The U.S. heavily criticized China's possible lack of clarity and transparency under the Trump administration. Interestingly, it is possible to notice, to a certain extent, similarities between the accusation moved by the U.S. over COIVD-19 against China and the accusation against the WHO over AIDS exposed in chapter 3.2, even though the actors involved are different. At a press conference on 22 September 2020, U.S. President Donald Trump claimed that:

> *"The Chinese government, and the World Health Organization – which is virtually controlled by China – falsely declared that there was no evidence of human-to-human transmission. Later, they falsely said people without symptoms would not spread the disease. The United Nations must hold China accountable for their actions."*[206]

[205] Rauhala, E. (2020, February 8). *Chinese officials note serious problems in coronavirus response. The World Health Organization keeps praising them.* Retrieved February 1, 2022, from The Washington Post: https://www.washingtonpost.com/world/asia_pacific/chinese-officials-note-serious-problems-in-coronavirus-response-the-world-health-organization-keeps-praising-them/2020/02/08/b663dd7c-4834-11ea-91ab-ce439aa5c7c1_story.html

[206] Trump, D. J. (2020, September 22). *Remarks by President Trump to the 75th Session of the United Nations General Assembly*. Retrieved February 1, 2022, from https://it.usembassy.gov/remarks-by-president-trump-to-the-75th-session-of-the-united-nations-general-assembly-september-22-2020/

The U.S. accusation against China also reflected the new geopolitical rivalry between the two nations. Only two years earlier, the two largest economies imposed against each other import tariffs. Eventually, the U.S. moved further with the accusations and threatened to leave the WHO, a move that would severely cripple the organization as the U.S. is by far the largest financial contributor. In this regard, the U.S. imposed a temporary freeze on payments to the WHO in early April 2020. The WHO denied any collusion with Chinese authorities.

Yet, the U.S. was not the only country with suspicions against the WHO. Several countries, individuals, and organizations accused it of lacking impartiality and having close ties with China. For example, Taiwan — which is not a member of the WHO — accused the organization of having adopted the denial position about human-to-human contagiousness based on the Chinese news despite the TCDC's early warning. Similarly, Japan's Deputy Prime Minister Taro Aso accused China of concealing COVID-19 information and the WHO for being assertive to Chinese authorities. Additionally, during a domestic parliament session, he suggested renaming the WHO as the "Chinese Health Organization".[207] China, for its part, had been widely criticized for having downplayed the emergency in its early stages and for having silenced and investigated Li Wenliang, the doctor who attempted to raise the alarm over the novel SARS-like virus on the basis to prevent the spread of false rumours.

However, despite many criticisms and alleged inefficiencies, the WHO allowed a determining and continuous share and gathering of epidemiological information and guidance. Yet, the COVID-19 pandemic exposed the fragilities of the present-day international health system, which relies almost exclusively on the cooperative approach of single countries. To a certain extent, countries can manipulate and conceal the news to prevent, for example, negative unilateral actions by other countries, such as trade and travel bans, and to prevent the spread of possible unverified rumours.

[207] Hernández, J. C. (2020, May 29). *Trump Slammed the W.H.O. Over Coronavirus. He's Not Alone*. Retrieved February 1, 2022, from The New York Times: https://www.nytimes.com/2020/04/08/world/asia/trump-who-coronavirus-china.html

3.3.1 COVID-19 VACCINES GLOBAL ACCESS (COVAX)

The COVAX is an international program that aims to provide equitable access to COVID-19 vaccines to all countries in need. It is part of the major global initiative Access to COVID-19 Tools (ACT)-Accelerator, which is a coordinated response supported by the WHO and its partners to develop tests, treatments, and vaccines globally. The COVAX program is one of the three pillars of the ACT-Accelerator, focusing on the development and distribution of vaccines. Such an unprecedented UN-backed cooperation operates in concert with several organizations: the GAVI Alliance, the WHO, the United Nations Children's Fund, and the Coalition for Epidemic Preparedness Innovations.

The ACT-Accelerator was launched in April 2020 by the WHO. Therefore, COVAX started when vaccines were still under development. The core point of the program ensures that the worldwide demand for vaccines does not get stalled by a competitive approach by wealthier nations to secure the greater number possible of vaccines for their populations. Lower-income countries can hardly secure a significant number of doses, and the COVAX aims at making sure that such countries receive their fair share. Overall, the philosophy behind the program is that no one is safe unless everyone is safe.

Under COVAX, more affluent countries are supposed to use their buying power to allow sufficient investments into the research and development of suitable vaccines rather than compete and leave poorer nations exposed to the pandemic. The number of doses distributed globally through the program ensures that countries receive sufficient doses to vaccinate no more than 20% of their total population until all participating countries receive the same amount. In this regard, the funds flowing from wealthier nations to research centres and industrial plants should allow vaccine supplies to increase for all, regardless of poorer countries' ability to contribute to the program.

Thus, COVAX aims at ensuring the avoidance of beggar-thy-neighbour policies that would undermine a global, effective campaign and a prompt ending of the sanitary emergency by restricting the flow of vaccines. Yet, to the present day, over a year has elapsed since the approval of effective vaccines and the start of the vaccination campaign in several countries exposed a considerable inequality between the Global North and the Global South. Indeed, the more affluent countries' vaccination rates are remarkably higher than those in poorer nations, casting doubts over the effectiveness of the COVAX program for equitable access.

Despite considerable efforts, coordinated access to vaccine supplies worldwide was limited. Richer countries succeeded in securing large vaccine stocks enough to vaccine their entire population

twice or thrice through bilateral purchase agreements with pharmaceutical companies to the detriment of lower-income countries. Arguably, the global vaccination campaign suffered considerable slowdowns due to "vaccine nationalism". Vaccine nationalism refers to the ability of a country to secure vaccines according to its national interest through bilateral agreements or export bans, or a combination of those factors, and consequently reducing the overall vaccine supply that other countries can purchase.

It is important to notice that no enforcement mechanism can effectively prevent such a practice at the international level. Henceforth, government leaders are likely to prioritize their own country's population over higher-risk groups such as health care workers or vulnerable populations in other countries. To a certain extent, the distribution of vaccines within the EU differed, albeit limitedly, from this approach due to the coordinating role of EU institutions. Vaccine nationalism is considered by Bollyky & Bown (2020) as a "my country first"[208] approach in allocating doses supplies. The authors warn that such a competitive practice may have severe consequences to the point of extending the length of the pandemic and its death toll.

Additionally, it may result in a possible increase of vaccines' prices and unilateral actions by countries with limited access to the available supplies. Such countries may secure them through exports ban of critical components, undermining the global supply chains of raw material and medical equipment needed for the vaccination campaign. Interestingly, in the authors' work titled *"The Tragedy of Vaccine Nationalism*", written when vaccines were still under clinical trials, some of the authors' assumptions proved correct, as exports bans have undermined the international supply of vaccines and other relevant components. For example, trade restriction practices were adopted in the U.S., India, and the EU.

Such countries imposed trade restrictions on covid-related products adopting specific domestic laws. The U.S. relied on the Cold War-era Defense Production Act invoked by the Trump administration in a controversial move to prevent exports of domestic protective equipment. Likewise, the Biden administration adopted the act to increase vaccine production and banned exports of critical components, prioritizing the domestic vaccination campaign to the detriment of other countries' production. For example, the Serum Institute of India urged the U.S. to lift the embargo on raw materials needed for the domestic production and exports of the AstraZeneca vaccine and the Indian Covovax (Jerving, 2021).

[208] Bollyky, T. J., & Bown, C. P. (2020, September/October). *The Tragedy of Vaccine Nationalism. Only Cooperation Can End the Pandemic*. Foreign Affaris, 99(5), pp. 96-108. Retrieved February 2, 2022, from https://www.wto.org/english/tratop_e/trips_e/techsymp_290621/bown_pres2.pdf

Similarly, as one of the largest vaccines and raw components manufacturers, India restricted their exports following a surge of COVID-19 cases to meet domestic demand. However, several African countries depended on India's vaccines to meet their domestic need. The Africa Centres for Disease Control and Prevention director John Nkengasong warned that a prolonged export ban to Africa would be "catastrophic",[209] as the continent mainly relies on the free vaccine provided under COVAX.

In Europe, the EU regulation 2021/111 adopted by the European Commission on 29 January 2021 imposed that the products used to contrast COVID-19 were subjected to an export authorization. Such a decision followed some vaccine manufacturers' inability to deliver the doses previously secured by the Commission on behalf of the EU member states. According to the regulation, the condition to grant the export authorization is met when the "volume of exports is not such that it poses a threat to the execution of the Union Advanced Purchased Agreements concluded with vaccines manufacturers".[210] Yet, vaccines supplies destined to poorer nations through COVAX were exempted from the regulations as well as several other countries.

The WHO General Director criticized the EU for its "vaccine nationalism",[211] claiming that its exports ban would prolong the pandemic, widen global inequality, and slow the economic recovery. However, the delayed vaccination campaign that led to such measures put considerable pressure on the European Commission by the EU member states. Arguably, the export ban possibly prevented the insurgence of several uncoordinated bilateral agreements between member states and pharmaceutical companies, which would have further fuelled vaccine nationalism policies and reduced even more the available supply.

Given the numerous export bans of products contrasting COVID-19 that were adopted, it is necessary to assess whether such unilateral acts by states are permitted under international law. Public health has long been considered a core sector for protectionist measures since the 1970s (Demir & Sepli 2017). Furthermore, Alazzam et al. (2020) suggest that limiting exports during a health emergency like COVID-19 involve considerable risks because: (I) it endangers foreign countries suffering the pandemic and (II) expose the country itself to foreign retaliation, potentially

[209] Jerving, S. (2021, April 1). *Export restrictions in India could stunt Africa's 2021 vaccination goals*. Retrieved February 2, 2022, from Devex: https://www.devex.com/news/export-restrictions-in-india-could-stunt-africa-s-2021-vaccination-goals-99567

[210] European Commission. (2021, January 29). *Commission Implementing Regulation (EU) 2021/111 of 29 January 2021 making the exportation of certain products subject to the production of an export authorisation*, §7 p.2. Retrieved February 2, 2022, from http://data.europa.eu/eli/reg_impl/2021/111/oj

[211] Lee, G. (2021, January 30). Coronavirus: *WHO criticises EU over vaccine export controls*. Retrieved February 2, 2022, from BBC News: https://www.bbc.com/news/world-europe-55860540

undermining the global supply chain of critical products; thus undermining a climate of cooperation and shifting toward a competitive approach. Moreover, medical equipment, for example, high-end ventilators, require advanced technologies to meet global standards to export them that are not present in Africa, the Middle East, South Asia, and within the Commonwealth of Independent States region and are hardly present in Latin America. Thus, countries in those regions entirely rely on imports from abroad (Global Trade Alert, 2020).

Ibrahim (2021) provides a helpful insight into the several trade agreements that can affect medical and vaccine trade supply. Among existing trade agreements, the most relevant for this study are the General Agreement on Tariffs and Trade (GATT), the General Agreement on Trade in Services (GATS), the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS), the Agreement on the Application of Sanitary and Phytosanitary Measures (SPS), and the Agreement on Technical Barriers to Trade (TBT). The GATS, TRIPS, SPS, TBT apply on general terms to liberalize trade and contain several exemptions on exports bans. For the economy of space, this chapter considers the following articles of the GATT, which are the most pertinent about exports ban linked with COVID-19:

- Art. XI §1 states that:

> "No prohibitions or restrictions other than duties, taxes or other charges, whether made effective through quotas, import or export licenses or other measures, shall be instituted or maintained by any contracting party on the importation of any product of the territory of any other contracting party or on the exportation or sale for export of any product destined for the territory of any other contracting party."[212]

However, an exception is found in Art. XI § 2(a), which states that:

> "Export prohibitions or restrictions temporarily applied to prevent or relieve critical shortages of foodstuffs or other products essential to the exporting contracting party."[213]

- Art. XIII § 1 does not exclude trade restrictions if implemented to mirror another country's restrictions. It states that:

"No prohibition or restriction shall be applied by any contracting party on the importation of any product of the territory of any other contracting party or on the exportation of any product destined for the territory of any other contracting

[212] World Trade Organization. (1947). *The General Agreement on Tariffs and Trade (GATT 1947)*, Art. XI §1. Retrieved February 2, 2022, from https://www.wto.org/english/docs_e/legal_e/gatt47_01_e.htm
[213] Ibid, Art. XI § 2.

party, unless the importation of the like product of all third countries or the exportation of the like product to all third countries is similarly prohibited or restricted."[214]

Further exceptions are collected in Art. XX. It states that:

"Subject to the requirement that such measures are not applied in a manner which would constitute a means of arbitrary or unjustifiable discrimination between countries where the same conditions prevail, or a disguised restriction on international trade, nothing in this Agreement shall be construed to prevent the adoption or enforcement by any contracting party of measures:

- (b) necessary to protect human, animal or plant life or health.
- (j) essential to the acquisition or distribution of products in general or local short supply; *Provided* that any such measures shall be consistent with the principle that all contracting parties are entitled to an equitable share of the international supply of such products."[215]

Henceforth, countries under GATT regulations possess legal means to adopt restrictions on exports of COVID-19-related products if certain conditions are met; that is, restrictions cannot be arbitrary imposed to create unjustified discrimination, must be temporary, and must be applied on limited categories of essential products to prevent vital shortages. Thus, the author of this study concludes that given the significant margin of appreciation of states, the U.S., Indian, and EU export bans on COVID-19 products are likely consistent with present international law.

[214] Ibid, XIII § 1.
[215] Ibid, Art. XX (b), (j).

3.4 FUTURE DISEASE THREATS

3.4.1 BIOLOGICAL WARFARE AND BIO-THREATS

Humans have long used diseases to damage their enemies. The WHO defines biological weapons as "microorganisms like virus, bacteria, fungi, or other toxins that are produced and released deliberately to cause disease and death in humans, animals or plant".[216] One of the first recorded accounts of biological warfare happened in 1347 when the Mongol army besieged the city of Caffa (present-day Feodosiya). Caffa was a major Genoese trading post in Crimea, with a key position within the commerce network of the Black Sea and Asian trade. Gabriele de' Mussi' work "*Historia de Morbo*" provides a valuable account of such a biological attack. However, he likely did not personally witness the event and to what extent his narration is accurate remain unclear. According to de' Mussi, as cited by Horrox (1994), a "mysterious illness"[217] spread in Asia, rapidly killing the afflicted populations.

The same fate happened to the besieging Mongol army outside Caffa. Because of the disease, the Mongols were aware that they could not keep the siege in place. Therefore, they decided to catapult the plague-ridden corpses into the city, hoping that the "intolerable stench"[218] would cause the same destruction. According to de Mussi's narration, the inhabitants contracted the disease and fled the town. In the author's view, the disease was a divine punishment, and the symptoms were caused by "coagulating humours".[219] While de Mussi's understating of the disease was wrong, his claims that the biological attack worked is plausible. The defenders may have contracted the plague by handling the diseased cadavers, as the plague can transmit through contact with infected material.

Furthermore, Wheelis (2002) excludes that the plague accidentally entered Caffa through infected rats from the besieging army's camp. The army likely camped around one kilometre away from the city, making it less probable for the rats to reach it. Additionally, the army's frontline presumably remained at the maximum distance allowed by the Mongol catapults, that is, between two hundred and three hundred meters. Henceforth, the biological attack allegedly perpetrated by the Mongols provides a valuable historical example that infectious diseases could be effectively used as

[216] World Health Organization. (n.d.). *Biological weapons*. Retrieved February 5, 2022, from World Health Organization: https://www.who.int/health-topics/biological-weapons
[217] Horrox, R. (1994). *The Black death*. Manchester: Manchester University Press, p.16.
[218] Ibid, p.17.
[219] Ibid.

a military tool at least since Medieval times. Overall, episodes involving biological weapons were perpetrated systematically throughout human history.

Present-day international law bans the use of biological weapons through two main international agreements. Firstly, the Protocol for the Prohibition of the Use in War of Asphyxiating, Poisonous or Other Gases, and of Bacteriological Methods of Warfare, signed in Geneva in 1925 and entered into force in 1928. Except for a few documented violations that received firm international condemnation, the Geneva Protocol of 1925 has been respected in most armed conflicts ever since.

The Geneva Protocol of 1925 was supplemented by the Biological and Toxin Weapons Convention (BTWC), formally known as the Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on their Destruction. It was signed in 1972 and entered into force in 1975. Therefore, under the BTWC, international law prohibits the development, production, stockpiling, acquisition, transfer, retention and the use, under any circumstance, of biological and toxic weapons.

- Art. I states that:

"Each State Party to this Convention undertakes never in any circumstances to develop, produce, stockpile or otherwise acquire or retain:
(1) microbial or other biological agents, or toxins whatever their origin or method of production, of types and in quantities that have no justification for prophylactic, protective or other peaceful purposes;
(2) weapons, equipment or means of delivery designed to use such agents or toxins for hostile purposes or in armed conflict."[220]

- Art. VI stresses the need for mutual observation among participating countries, reporting to the UN suspicious activities. It reads as follow.

"(1) Any State Party to this Convention which finds that any other State Party is acting in breach of obligations deriving from the provisions of the Convention may lodge a complaint with the Security Council of the United Nations. Such a complaint should include all possible evidence confirming its validity, as well as a request for its consideration by the Security Council.

(2) Each State Party to this Convention undertakes to co-operate in carrying out any investigation which the Security Council may initiate, in accordance with the provisions of the Charter of the United Nations, on the basis of the complaint received by the Council. The Security Council shall inform the States Parties to the Convention of the results of the investigation."[221]

[220] United Nations. (1972). *Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on their Destruction*. Retrieved from https://front.un-arm.org/wp-content/uploads/2020/12/BWC-text-English-1.pdf
[221] Ibid.

It is important to note that the BTWC advocates for international cooperation.

- Art. X states that:

(1) "The States Parties to this Convention undertake to facilitate, and have the right to participate in the fullest possible exchange of equipment, materials and scientific and technological information for the use of bacteriological (biological) agents and toxins for peaceful purposes. Parties to the Convention in a position to do so shall also co-operate […] to the further development and application of scientific discoveries in the field of bacteriology (biology) for the prevention of disease, or for other peaceful purposes."[222]

Yet, despite the certain degree of protection provided by international law, biological weapons constitute an ever-increasing threat to human health. However, in recent times, states hardly relied on such weapons. The most flagrant cases were carried out during World War II by the Japanese Imperial Army, which intentionally spread the plague, cholera, typhoid, and other diseases against the Chinese civilian population, causing an estimated 300,000 deaths. The infectious pathogens were mass-produced in Japanese-occupied China in secret facilities subsequently destroyed after the war. Eventually, the U.S. effectively covered up the little evidence that survived in exchange for crucial information over the experiments (Harris, 1994).

There are several reasons why a state may be attracted to obtain biological warfare. For example, such weapons can be used to offset a conventional or nuclear advantage possessed by the enemy. Additionally, biological weapons are dramatically cheaper and easier to develop than nuclear weapons, and such processes are easier to conceal and carry out covertly. Interestingly, the development of biological weapons was carried out systematically during the Cold War. For example, the Soviets built their first smallpox arms factory shortly after World War II in 1947 in Zagorsk (present-day Sergiyev Posad) and maintained a covert program for developing bio-weapons throughout the Cold War (Alibek 1999).

The Soviets thus adopted a paradoxical approach against smallpox during the Cold War. On the one hand, the U.S.S.R. was the largest supplier of smallpox vaccines, without which the SEP could not have been successful. On the other hand, it stockpiled large quantities of smallpox annually for biological weapons. The covert program for biological weapons was expanded during the mid-1980s with the construction of several facilities and increased funds. Furthermore, Soviet scientists made considerable advancements in bioengineering diseases to nullify vaccines' effectiveness (Alibek 1999).

[222] Ibid.

Among the artificially cultivated diseases, smallpox was one of the leading candidates for potential use in war, together with the plague, Marburg, and anthrax. The latter was also the protagonist of a major laboratory leak that caused an outbreak in Sverdlovsk (present-day Yekaterinburg), causing several deaths among the local population in 1979. The anthrax incident resulted in an international debate over the epidemic's origins. The U.S. accused the U.S.S.R. of accidentally releasing the spores from a nearby military facility. After an initial denial by the Soviet government, the first admission of the involvement of the military laboratory and the KGB arrived from Soviet President Boris Yeltsin in 1993.

The anthrax incident proves an interesting starting point for exposing certain risks linked to biological weapons and the limits within the legal framework in banning them. The most apparent assumption reveals that pathogens can leak from "secure" places like military installations or private laboratories, thus endangering the population. Another helpful example can be found in Birmingham in 1978, where the scientist Janet Parker, researching at the Birmingham Medical School, contracted smallpox. While Parker became infected with the virus in the laboratory, the exact method of transmission remains unclear. The virus presumably spread either by: (I) air current, (II) personal contact or (III) contact with infected material. Thus, even if infectious pathogens are stored in ad-hoc facilities for peaceful purposes (for example, scientific research), biosafety risks persist.[223]

While states adopt their own national safety rules, the WHO issued voluntary biosafety guidelines. The WHO (2020a)'s "*Laboratory biosafety manual*" serves as a de facto global standard for best practices and sets trends in biosafety. Nowadays, research laboratories are generally safe, and the risk of incidents involving infected biological material are sensibly low. Yet, certain laboratory research on highly infectious diseases, especially potential pandemic pathogens (PPPs), may pose significant risks. PPPs are "bacteria, viruses and other microorganisms that are likely highly transmissible and capable of wide, uncontrollable spread in human populations",[224] including, for example, SARS-CoV- and SARS-CoV-2. Research on PPPs is usually justified by compelling health needs, studying the nature of human-pathogen interactions, assessing the pandemic potential of emerging infectious agents, and enchain preparedness efforts (National Institute of Health, 2021).

[223] Biosafety refers to the "containment principles, technologies and practices that are implemented to prevent unintentional exposure to biological agents or their inadvertent release." World Health Organization. (2020a). *Laboratory biosafety manual* (4th ed.). Geneva, p.X. Retrieved February 4, 2022, from https://www.who.int/publications/i/item/9789240011311

[224] National Institute of Health. (2021). *Research Involving Enhanced Potential Pandemic Pathogens*. Retrieved February 4, 2022, from National Institute of Health: https://www.nih.gov/news-events/research-involving-potential-pandemic-pathogens

Among the PPPs currently studied, there is smallpox. Indeed, although successfully eradicated by the SEP campaign, smallpox is not extinct. In this regard, in 1996, the WHA recommended the destruction of the last known stocks of *Variola* virus. However, to present date, the U.S. and Russia still maintain smallpox samples under high-security conditions in the CDC in Atlanta and in the State Research Center of Virology and Biotechnology VECTOR in Novosibirsk. Given the exceptional risks to global public health, research on smallpox is limited to those two laboratories. Moreover, research on smallpox is subject to a pre-approval by the WHO, which is also in charge to keep an annual inventory of the samples and a biennial inspection of the laboratories.

While the laboratories storing the virus conforms to the highest safety and security measures, it cannot be wholly excluded that it may leak. For example, authorised personnel may successfully smuggle the virus outside, even if it is a highly remote possibility. Against the unfortunate event that smallpox may return at its endemic state — either by accident or deliberately —, emergency vaccine stockpiles are currently held within the WHO's headquarters in Switzerland and by several member countries, including France, Germany, New Zealand, the United Kingdom, and the U.S. (World Health Organization, 2017).

The choice of keeping smallpox alive is controversial, and the scholarly opinion is still currently divided over whether the U.S. and Russia should destroy the last remaining samples of smallpox. However, even if the samples would be destroyed — for example, by incineration — following an agreement of the international community, there is no effective means to assure with sufficient confidence that the samples would not have been transferred to other places prior to the destruction. Thus, virus samples would remain alive and hidden from international inspections. Furthermore, while risks linked to smallpox are minimum, it cannot be excluded that other infectious pathogens are being covertly held in some countries for non-peaceful reasons. In this regard, the U.S. accused several countries of having active offensive biological warfare programs: China, Iran, North Korea, Russia, and Syria (U.S. Department of State, 2005).

Moreover, biological weapons are not necessarily linked with governments. Biological weapons can also be acquired by terrorist groups and pose a biosecurity risk.[225] For example, in 1993, the Japanese religious group Aum Shinrikyo attempted a biological attack by aerosolizing a liquid containing spores of *Bacillus anthracis*. The attempt failed, and no death or injury resulted. A similar

[225] Biosecurity refers to the "principles, technologies and practices that are implemented for the protection, control and accountability of biological materials and/or the equipment, skills and data related to their handling. Biosecurity aims to prevent their unauthorized access, loss, theft, misuse, diversion or release." World Health Organization. (2020a). *Laboratory biosafety manual* (4th ed.). Geneva, p.XI.

incident was the anthrax letter attack of 2001, allegedly perpetrated by a U.S. scientist working in Fort Detrick, who mailed letters containing anthrax spores. The biological attack resulted in the death of five people and was considered the "worst biological attack in U.S. history".[226] Such events raised awareness over the potential risk caused by pathogens — even causative agents of generally considered non-contagious diseases like anthrax — that terrorist groups can use to advance a specific ideological or political cause, or more simply, to generate chaos and instil fear among the population. Therefore, biological weapons can be an attractive choice for such groups searching for a feasible way to maximize fear and increase the death toll on their targets.

Overall, international law relies on the cooperative behaviour of states, with little effective control and enforcement mechanisms. Indeed, the BTWC does not include regular inspections or other intrusive methods to enforce and monitor treaty compliance. Furthermore, assessing the treaty's compliance is often a difficult task while it is relatively easy to hide covert programs that may violate international law. However, the BTWC does not impede the legitimate use of infectious agents for peaceful purposes. Yet, the demarcation line between legitimate and prohibited use cannot easily be defined. Thus, states can rely on such borderline programs to advance dual-use research. Henceforth, suspicious programs are difficult to be effectively reported to the UN, as prescribed by Art. VI of the BTWC, in order to be effectively monitored and contrasted.

[226] Federal Bureau of Investigation. (n.d.). *Amerithrax or Anthrax Investigation*. Retrieved February 5, 2022, from FBI: https://www.fbi.gov/history/famous-cases/amerithrax-or-anthrax-investigation

3.4.2 Global change and its impacts on infectious diseases

Many infectious diseases were assumed to be under control and on the verge of global eradication by the late 1960s. Such optimism can be appreciated by a famous statement attributed to U.S. military surgeon William H. Steward who allegedly claimed in 1967 that vaccines and antibiotics were proving to be successful to the point that "it is time to close the book on infectious diseases, and declare the war against pestilence won".[227] This statement was wrongly published in several authoritative journals, including *The Lancet*, as recent studies disproved that Steward ever said such words (Spellberg & Taylo-Blake, 2013). Yet, it exposes the confidence with which certain infectious diseases were believed to be likely to disappear in the foreseeable future.

Nowadays, the world must cope with old pathogens and new ones. While scientific progress allowed several infectious diseases to stop being a major public health concern, other diseases emerged recently, and long-standing ones acquired new momentum. Today many infectious diseases are increasing, for example, SARS-like viruses and malaria. The latter showed an estimated increase of 14 million global cases in 2020 compared with the previous year, passing from an estimated 227 million cases in 2019 to 241 million cases in 2020. Thus, despite considerable progress in eradicating malaria from several countries — El Salvador and China were certified malaria-free in 2021 — malaria is still a global health issue with no realistic expected date for its possible global eradication (World Health Organization, 2021).

Many different factors affect the emergence and spread of infectious diseases, such as a change in the landscape which brings hosts into contact with new pathogens, a change in population density and other human activities like long-distance travels and trade, or the appearance of a major disruptive event like war or a natural disaster that would impede the normal disease surveillance activities. The keyword is "change". Arguably, human activities have a tremendous impact on the environment to the point of being one of the most significant drivers for the emergence of epidemic diseases. The current unsustainable human activities that lead to climate warming, loss of biodiversity, land degradation and intensive farming can considerably increase the chances of future pandemics.

Climate change is one of the leading factors for the emergence of new infectious diseases. Global temperature is expected to become 1.5°C warmer than pre-industrial levels within the next two decades (2021-2040 time period considered), according to the *Sixth Assessment Report* of the 2021 Intergovernmental Panel on Climate Change (IPCC). Longer terms of global warming scenarios

[227] Bristol, N. (2008, July 12). *William H Stewart*. The Lancet, 372(9633). doi:10.1016/S0140-6736(08)61022-3

differ according to the amount of greenhouse gas emissions: the global surface temperature for the 2081-2100 period is projected to range between 1.4°C (best-case scenario) and 4.4°C (worst-case scenario).

Weather temperature alone can influence the transmissibility of numerous pathogens among host populations. For example, the scholarly opinion suggests that climate change will significantly impact vector-borne diseases that typically use mosquitos as intermediate hosts like malaria, dengue, yellow fever, Zika and West Nile fever. As a result of a warmer climate, the distribution of specific vectors may change according to new temperatures, thus affecting the different populations that would not normally enter in contact with the vector. Several mosquito's species usually die during the cold season. Therefore, warmer winters may allow them to survive in greater numbers, leading to unusual disease development in many regions in different latitudes and altitudes.

In Europe, there may be an increased prevalence of food-borne diseases like salmonellosis, which may lead to food safety issues, and of vector-borne diseases. For example, malaria was locally transmitted in Greece in 2012, chikungunya in France and Italy in 2017, and Zika in France in 2019. Furthermore, climate change is expected to influence extreme weather events such as drought and rainfall, creating favourable conditions for many vector-borne diseases (Brownlie et al., 2006). Likewise, water-borne diseases like cholera may increase their prevalence due to rising temperatures and precipitation. The authors agree that even though it is impossible to predict with precision to what extent climate change will affect infectious diseases, there is sufficient consensus that it will provide a significant challenge to global health.

Global warming may be responsible for the re-emergence of past diseases which were partially or entirely eradicated. Recent studies (El-Sayed & Kamel, 2020) point to possible biohazards caused by melting ice and frozen snow that may uncover ancient viruses and bacteria. Pathogens were found on the buried remains of animals — including extinct species — and in various environmental samples, with higher prevalence in Siberia due to the abundance of permafrost. Noteworthy, some pathogens may survive for an extended period in permafrost through spores or cyst-like cells, and their introductions may lead to unknown consequences (Brouchkov et al., 2017).

Other pathogens, like vector-borne diseases, can survive the chemical compounds intended to kill them. The most obvious example is the resistance acquired by mosquitoes acting as malaria vectors. Soon after the launch of the MEP by the WHO, mosquitos carrying malaria soon developed resistance to DDT which eventually stalled the program and forced it to switch by eradication to control. Yet, despite new insecticides being adopted for widespread use like organophosphates and pyrethroid, mosquitoes' resistance issues continued. Pesticide resistance is a trend that is expected to

continue in the future, and the implementation of new insecticides coupled with different control methods will be needed (Knobler et al., 2003). Exposure to such pesticides may negatively impact human health and the environment. DDT, long credited as one of the leading pesticides to fight malaria, is currently banned in several nations but still in use, especially in many African countries and India. Curiously, the book *Silent Spring*, one of the forerunners of modern environmentalism, is credited with having increased awareness to the public, governments and scientific community about the dangers posed by DDT in the early 1960s.

Among other driving factors, there is the land-use change. Urban and infrastructure expansion coupled with new lands taken for agriculture and livestock farming may significantly create risk factors for spillover. Such activities are often carried out through deforestation, which changes several pathogen transmission dynamics. For example, affected areas usually experience considerable biodiversity loss, which results in few concentrated species — like bats, rodents, and primates — which are known to host numerous diseases transmissible to humans. Moreover, people living in rural areas are more likely to have close and repeated contacts with wild animals. The former may venture into forested habitats to collect food and building materials like wood, while the latter are attracted to human settlements as a source of food (Bloomfield et al., 2020). Moreover, in many cases, behaviours linked with biodiversity loss are often deeply connected with economic and cultural factors that lead rural populations to depend on hunting and trading wild animals.

Wildlife trade is often associated with the emergence of epidemic diseases. In this regard, national and international laws are becoming increasingly stricter. For example, Southeast Asia is a crucial hub of wildlife trafficking, where unregulated commerce of live and dead animals regularly occurs. Consequently, non-governmental organizations like the World Wildlife Fund (WWF) advocate a firm ban of such practices. Shortly after the COVID-19 pandemic, China and Vietnam enforced bans on the previously largely unregulated wildlife commerce. However, both face implementation issues — especially in rural communities — and exemptions that can considerably reduce their scope of preventing spillover (Carlson et al., 2021).

Yet, international law can play a starker role in further contrasting potentially dangerous animal trade, for example, by implementing bolder initiatives at the UN level, such as the UN General Assembly, which has also been involved in mitigating the spread of COVID-19 and its economic effects. Furthermore, as Ashe & Scanlon (2020) suggest, stricter laws may be approved with an ad-hoc protocol under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), which is a legally binding treaty. However, CITES regulates international trade and does not currently consider public and animal health issues. In this regard, the CITES Secretariate

stated that "matters regarding zoonotic diseases are outside of CITES' mandate".[228] A contrary opinion against the possible amendment of CITES was expressed by Lieberman (2020), affirming that the convention has no capacity in dealing with the prevention of spillover risks and that such a proposed amendment would fundamentally alter the convention's principles.

Arguably, the COVID-19 pandemic recently highlighted the need for increased international cooperation to prevent future zoonotic epidemic diseases. Therefore, it is not excluded that already existing treaties like the Convention on Biological Diversity, or international bodies, such as the United Nations' Food and Agriculture Organization, the World Organization for Animal Health or the WHO, may produce effective countermeasures against pandemics.

The scientific community commonly agree that it is only a matter of time until the next pandemic begins. Against such a risk, the WHO expressed the will to produce a specific international treaty to prevent and handle future health emergencies, thus building effective pandemic prevention, preparedness and response. Regarding the current COVID-19 pandemic, the WHO General Director Tedros A. Ghebreyesus acknowledged the numerous flaws in the global system that led to a scarcity of vaccines for the most vulnerable, of the essential protective equipment for health workers and the "'me-first' approaches that stymie the global solidarity needed to deal with a global threat".[229] The initial meeting on the proposed new convention is expected to take place in March 2022, and a second one is scheduled for August 2022. A progress report will be presented at the 2023 WHA, and the final outcome will be submitted in 2024.

[228] CITES Secretariate. (2021, January 12). *CITES Secretariat's statement in relation to COVID-19.* Retrieved February 7, 2022, from CITES: https://cites.org/eng/CITES_Secretariat_statement_in_relation_to_COVID19

[229] World Health Organization. (2021, December 1). *World Health Assembly agrees to launch process to develop historic global accord on pandemic prevention, preparedness and response*. Retrieved February 7, 2022, from World Health Organization: https://www.who.int/news/item/01-12-2021-world-health-assembly-agrees-to-launch-process-to-develop-historic-global-accord-on-pandemic-prevention-preparedness-and-response

CONCLUSIONS

Throughout history, health cooperation has not been a linear, steady process. It is possible to argue that humankind has always found ways to cooperate in the common, global fight against diseases. Still, it has also found ways to use and exploit them to the detriment of rival communities. Today, health cooperation has reached an unprecedented level, yet it still includes significant limits and flaws. Tackling epidemic diseases is a transboundary problem that requires a global-scale response that entails many challenges, including a considerable degree of collaboration among states and non-governmental organizations, the need for consistent funding, significant involvement of public participation and the difficulty for health authorities to prevent and contrast epidemic diseases often under conditions of uncertainty. This thesis aimed to propose an account of the evolution of international sanitary cooperation as a response to infectious epidemic diseases.

First, it was necessary to delineate the background information and essential concepts to achieve this aim. Yet, numerous issues over the definitions of key terms were quickly encountered, as the meaning of certain words changed over time. What today is referred to as endemic diseases or a pandemic was not what was meant in the 17th century when related terms were first used. Issues of definitions frequently reoccurred throughout the analyzed documents, such as the transcriptions of the numerous international sanitary conferences of the 19th century. Back then, words such as "epidemic" often assumed variegated meanings, including today's notion of endemicity.

Furthermore, words such as "plague" would often refer to numerous diseases, especially those over which little was known. Similarly, words such as "germ" and "virus" were used interchangeably, even long before their discovery. For the sake of clarity, the author of this study refrained from using such words when not scientifically correct. This cacophony of definitions exposed the lack of medical/scientific knowledge typical of the early debates over health matters. In this regard, it is possible to conclude that the lack of consensus, either over the origins of diseases or the means of transmission, severely limits international cooperation. Also, it compounds the possibility of reaching an effective and satisfactory agreement between the negotiating parties, such as governments.

Further findings suggest that the lack of knowledge over a given disease (such as the examples of the plague, cholera, and HIV reported in this work) provided fertile ground for fake news to spread. As reported primarily in chapters 2.1 and 3.2, the lack of epidemiological knowledge about the plague made it easier for Mediterranean states to use false news as a tool for damaging rivals. To this end, chapter 2.1 reported the example of certain maritime powers damaging each other spreading false

news about the plague, redirecting commerce on specific trade routes while economically damaging rivals. To a certain extent, it is possible to refer to this as a "sanitary war". Fake news, like diseases themselves, transcends from national borders and rapidly spreads to other cities, countries, and continents alike. As shown in this work, the technology of a given period reflects the capacity and speed for rumours to reach the designated target. As shown, in the Early Modern Period, news about diseases mainly spread through word of mouth, letters, and diplomatic channels. In the 1980s, as the AIDS disinformation campaigns exposed, radio, newspapers and television were tools to spread intentionally false stories. Nowadays, false news spreads rapidly and globally through the internet, a trend expected to increase in the future, thus posing significant challenges. Furthermore, information networks were also effectively used to move accusations against rival states over the intentional concealing of crucial epidemiological information. It is safe to conclude that this trend did not stop from the Early Modern Period to the present day, as the COVID-19 pandemic painfully exposed.

This thesis demonstrated that the international community had considered numerous epidemic diseases during the long process of international cooperation. The plague was the most discussed and feared disease during the Early Modern Period. Indeed, the plague dominated most sanitary practices and health policies until the second half of the 19th century, as the plague was considered importable. Overall, those diseases considered importable triggered determined sanitary policies that required a certain degree of cooperation, like the network of quarantine facilities and the mutual recognition of bills of health. Similar documents are still in use to the present day. Cholera gained momentum after its introduction in Europe during the first half of the 19th century and became one of the most prominent diseases discussed internationally. Yet, it lacked scientific consensus for much of the 19th century and was highly debated whether it could be an importable disease or not. Although numerous states considered cholera to be non-contagious, it triggered the international debate that culminated in a long series of international conferences. Still, like several other diseases, it triggered the establishment of numerous institutions of disease surveillance and ad-hoc committees in several countries.

On the contrary, smallpox's endemicity was widely recognized and raised little concern over its importation. Still, it acquired considerable attention from the international community as it triggered several international campaigns during the modern and contemporary period. Furthermore, smallpox and malaria became widely addressed during the mid-1900s through specifically designed eradication programs. On the other hand, AIDS triggered specific technical cooperation, such as sharing information and medical expertise. Malaria was mostly absent from the international debate during the modern period as it has been long perceived to be inherently miasmatic and endemic.

Likewise, yellow fever was thought to be miasmatic for much of the 18th century. Eventually, it entered the international debate of the 19th century following numerous outbreaks in port cities, thus becoming considered importable.

Noteworthy, this thesis highlights that international health cooperation can occur even if adverse geopolitical rivalries exist. To this end, this thesis introduced the example of the Republic of Venice that participated in the share of relevant knowledge about the risks occurring when trading with possibly infected places and about its health magistracy' organization and functioning to its rival powers. Another example was extensively analyzed in chapter 3.1: the global vaccination campaign against smallpox, which took place during the Cold War. However, the sanitary cooperation against smallpox of the 1970s proved to be paradoxical, as, on the one hand, the confronting superpowers cooperated to reach its eradication. On the other hand, smallpox was being covertly developed as a biological weapon. Furthermore, to a certain extent, the vaccination campaign was also framed as a tool to enforce power and influence on the non-aligned countries, thus as an instrument to win the Cold War.

This thesis thus proves that sanitary cooperation is possible despite the adverse geopolitical environment; evidence of that is the Smallpox Eradication Program. In this regard, chapter 3.1 exposes the trust built between Henderson, the vaccination's campaign head and the Soviet Deputy Ministry Venediktov. Arguably, technical cooperation in health matters is likely to continue even in the context of geopolitical competition but unlikely to happen if confrontation turns to open war. In that case, epidemiological information will likely become a military secret, and relevant institutional bodies will likely stop their designated functions, as happened to the OIHP during both World Wars.

This work demonstrates that during the Early Modern Period, several countries favoured an international approach against diseases instead of being content with health policies within national borders. In this regard, it was possible to find that, in most cases, there was a prominent actor that led the way. Arguably, among the earliest actors, the Republic of Venice proved to be a crucial leader, to the extent that it created a sort of "Venetian standard" for health policies that enjoyed a certain degree of international consensus by Mediterranean powers. Thus, it can be concluded that Venice was the forerunner of standard health policies in the Mediterranean region, over which it had a prominent commercial role. It has been exposed that said policies were far from neutral, as they were effective foreign policy instruments. Venetian sanitary laws were usually arbitrary and discriminatory, also used to threaten neighbouring countries to comply with such laws or face exclusion from the trade network under Venetian control.

Furthermore, this work showed that a certain degree of standardization of health policy through a system of quarantine facilities and bills of health was adopted following Venice's example, which was also expanded to the American continent. Even countries that did not count on permanent quarantine facilities, such as Britain, recognized many Mediterranean lazarettos as safe places to quarantine high-risk ships. It was also showed that quarantine rules were highly jeopardized and, to a certain extent, used to redirect profitable trade routes to specific countries through relaxed sanitary rules, thus competing against the countries that adopted stricter rules. Such a system resulted in a highly chaotic system that soon became a core topic of international debates by policymakers, with mutual accusations of unfair sanitary practices. Consequently, in this context, during the first half of the 19th century, there was a renewed desire to establish order and standard rules.

Once again, it is possible to find a leading actor, such as France, which translated into practice such desire by hosting the first International Sanitary Conference in 1851 and many of the others that followed. Several countries soon hosted a long series of international sanitary conferences, several of which provided a negligible contribution, but some led to valuable outcomes. What has been noted is that a leader is usually needed to establish a certain degree of sanitary cooperation, be it a state or another institution. To this end, the WHO has been the designated leader since its foundation following the aftermath of World War II, thus marking a new phase in the history of health cooperation.

To this end, this work addressed the WHO's coordinating role throughout the COVID-19 pandemic, a clear example of the international community's need for strong leadership. To the extent that the cooperative behaviours of member states allowed, the WHO provided an effective tool for managing and contrasting pandemics at a global level. However, the analysis of the international response to COVID-19 exposed some of the weaknesses of the current international system of sanitary cooperation. The WHO almost exclusively relies on the cooperation of its member states. As the COVID-19 case showed, China, the first affected country, may not have provided all the necessary information on time as prescribed by the International Health Regulations, which mandate a timely communication of all the relevant epidemiological information to the WHO.

It appears that the long tendency since the Early Modern Period to conceal relevant information on the actual status of the health emergency is likely happening to the present day, and it is expected to be a weak point for the international system in the future as well. States might conceal crucial information to prevent the international community from taking unilateral actions against them. In this regard, since the Early Modern Period, states used to ban trade and travel to and from

places considered to be severely infected with a malady. Said bans caused significant economic losses to the point of making attractive the choice of hiding the outbreak as long as it was feasible to do so.

Thus, one of the shortcomings of the WHO is that it does not imply intrusive methods to carry out an independent investigation on a given country at the onset of an outbreak suspected to become a Public Health Emergency of International Concern. A revised global health regime with new obligations, strengthened cooperation, a reinforced information-sharing network, coupled with a more effective compliance system, may help build the necessary resilience against future health emergencies. Indeed, the global health system cannot be perceived as a static, fixed structure but as an evolving mechanism that can be improved and adapted.

The dreadful worldwide impact of COVID-19 highlighted the vital necessity for the world to respond rapidly and coherently to future pandemics. Throughout this work, it can be appreciated how infectious diseases followed humankind's global impact on the planet and underscored the connectivity between humanity and nature. Indeed, human health is intimately and intricately connected with the health of other species and the health of the environment.

In order to improve disease preparedness, it is essential to understand the multidisciplinary nature of the tasks required to change the current global health system and make it more resilient. Disease surveillance must not be limited to detecting a disease after the appearance of an outbreak's early signs but should outsmart and detect unknown pathogens before the outbreak begins. Such an objective can only be achieved with better scientific research, prevention models, and improving the current state of vaccine and therapeutic development. Yet, this improvement cannot occur exclusively in wealthier countries, where the risk of a new emergent disease is considerably lower than in low and middle-income countries. It is precisely in those most exposed places to zoonotic spillover events, mainly because of a higher incidence of risky behaviours like deforestation and wild animal trade, that a resilient global health system must be built. To this end, reducing inequalities in health matters is crucial because no one is safe until everyone is safe.

Yet, no matter how well-designed and coordinated these new plans to improve the current global health system will be if they are going to be applied to the current inadequately funded system. Furthermore, as remarked in this work, the WHO relies mainly on voluntary contributions, as the assessed payments are entirely insufficient. Voluntary contributions can be frozen at any moment, even during a health emergency for which the funds are most needed, as happened during the COVID-19 crisis. Henceforth, it is desirable that the WHO would be less dependent on voluntary contribution and that it could count to a greater extent on the more predictable assessed contributions.

Arguably, the international legal framework must be revised to the extent necessary to sensibly reduce existing driving factors for the emergence and re-emergence of infectious epidemic diseases. As mentioned in the last chapter of this work, it is possible to identify at least some of them, such as the risk of the deliberate use of pathogens in biological warfare or their use in terrorist activities. Other factors include their accidental release through possible pathogens leaks from existing laboratories researching on potential pandemic pathogens. Other human activities can pose several risks, such as deforestation and the consequent loss of biodiversity, the commerce of certain animal species, climate warming and the extensive use of chemical compounds that can induce pathogens and disease vectors to acquire resistance to pesticides. In this regard, it must be noted that the attempt to eradicate or control diseases should not be a causative agent for collateral damages to human health, animals, or the environment. On a final note, climate change will be one of the most significant driving factors for the emergence of infectious diseases and against which international cooperation will be needed to prevent and contrast them effectively. Infectious epidemic diseases are here to remain for a long time. Therefore, the international community is called to preserve, support and continue the joint global fight against them and lead the way for a healthier society.

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