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# Chile-Italy a Historicist View of Pandemics and Epidemics: ¿What are the Lessons we Must Learn? A Scoping Review Article

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## ABSTRACT

### Chile-Italy a historicist view of pandemics and epidemics

Background: Since the dawn of humanity, the human species has faced various epidemics that have decimated its population. Various causes have given rise to these epidemics, whether it is population growth, overcrowding, lack of

services and basic hygiene supplies, Wars, and famines, all have contributed in one way or another to the start of a pandemic. Understanding the phenomena and events that occurred in the past will allow us to understand our present and project ourselves toward our future.

**Objective:** The present study undertakes a scoping review of research Explain and demonstrate the main management of the largest pandemics in the history of medicine, exemplifying through the case of the management of the cholera pandemic in Chile and Italy.

**Design:** Online databases were used to identify papers published 1956-2021, from which 3425 we selected 30 publications from Chile, Italy, United Kingdom, the United States, that used the measures and epidemiological indicators as a primary or secondary outcome variable in studies that detail the managements and mortality, lethality, R0 and history of pandemics and epidemics.

**Results:** The majority of publications (33%) reported secondary historic studies while 40% examined primary historic resources and 27% correspond gray literature (reports, newspaper, editor letters, etc...). All but one of the studies collected measured data. Overall, 84% of the publications examined measures to fight against the pandemics. Those examining focused on. While most (66%) reported 1 or more epidemiological indicators and paleobiological evidence. Evaluated using a customized quality assessment instrument, 26% of studies achieved an "A" quality ranking, while 18 and 39% achieved quality rankings of "B" and "C", respectively.

**Conclusions:** While the quality of studies is generally middle, research on Systematic study of the history of medicine and pandemics will enable us to prevent and be better prepared for, and ideally anticipate, the emergence of new viral, bacterial, and protozoan variants, in the context of humans as part of a planetary ecosystem.

**Key Words:** Pandemic - Epidemiology - History of medicine - Chile - Italy

## Main Messages

- The historical analysis of the causes, management and consequences to be able to face a pandemic is essential.
- This study aims to describe and explain the variables of the socioeconomic, geographic, health system, environmental and genetic factors that have given rise to the main pandemics that have occurred in the history of humanity.
- Limitations: this scoping review uses both scientific literature sources and gray literature in its preparation and historical sources derived from universal literature, which adds a subjective component in the appreciations of the authors of their time when describing the epidemiological phenomenon.
- Result: we identified 30 primary studies, we counted the number of studies included in the review that potentially met our inclusion criteria and noted how many studies had been missed by our search. We analyzed 10 secondary studies, 12 primary historical resources and 8 newspapers article (gray literature), which were included in the framework in this study. It would be advisable to create a world virological center that studies and controls in a coordinated

manner, especially in countries with lower per capita income, such as third world countries where there is a greater risk of the appearance of new variants and other viral forms, in order to isolate and cut the chain of transmission of biological forms, providing sufficient information to be able to predict and take measures before the start of the epidemic and after the pandemic.

## Introduction

Six mistakes mankind keeps making century after century:  
 believing that personal gain is made by crushing others;  
 worrying about things that cannot be changed or corrected;  
 insisting that a thing is impossible because we cannot accomplish it;  
 refusing to set aside trivial preferences;  
 neglecting development and refinement of the mind;  
 attempting to compel others to believe and live as we do.

*Marcus Tullius Cicero*

Humanity has been faced with more than 20 major pandemics since the first Homo Sapiens appeared in Africa and spread to the rest of the globe, which spread throughout the continents when they came into contact with other human species that inhabited. The study of paleoanthropological evidence and human beings have shown the presence of protozoa of malaria, brucellosis and cholera in bone remains and teeth of the first australopithecines found in the Grand Rift and in Lake Turkana, the presence of cholera in the bones of hominids in Laetoli as a result of ingestion of contaminated water and which caused great mortality in the first hominids<sup>36,38,39,40</sup>

The management and measures that have been taken to face a pandemic have been key in reducing the effects that they have had on the spheres of sociopolitical, socioeconomic organization, public health services, which in turn depend on the variables geographic, environmental and genetic characteristics of the populations that live in the territories that are affected by pandemics. An example of this is the current Covid-19 pandemic, where, according to the survey carried out by the United Nations Development Program in Latin America<sup>10</sup>, it showed that the average employment rate at the regional level is still below the pre-pandemic level and the quality of available employment has worsened, on average, the number of hours worked per week is 14% lower than before the pandemic, close to 50% of households have not yet managed to return their total income to the pre-pandemic level, despite government support through transfers (both regular and emergency) and increases in private transfers, the drop in job availability affected everyone, although recovery has been slower for women (especially mothers), young workers and those with lower levels of education or training<sup>11</sup>.

In fact, one year after the start of the pandemic, the probability that women have stopped working is twice that of men. This has been accompanied by an increase in domestic

responsibilities, particularly the supervision of educational activities for girls and boys. In addition to this, we find a socio-sanitary crisis in relation to mental illnesses and emergency care as chronic pathologies in all health systems in the world<sup>2,10,11</sup>.

The impact that pandemics have had on our ways of life and on how we organize ourselves has caused different authors, poets and writers to relate about epidemics and pandemics and their consequences; putting as a model of epidemiological management and control of pandemics the model proposed by Giovanni Battista Grassi (27 March 1854 – 4 May 1925) who to do a important discovery of *Plasmodium falciparum* is the etiological agent by human malaria, who transported to digestive system of the anopheles in its cycle of life to transmit by the bite of the insect to the blood of the hostess, who beginning his scientific career in each University of Rome between the period 1901-1906 how to academic trainee of their wisdom research his master in Rome, in the control of the cholera outbreak in Italy, and the methods of isolation one proposed by Giovanni Battista Noe Crevanni to control in Malaria in Chile applied all the method of his master<sup>30,31,35,8</sup>.

Due to the aforementioned background, it is essential to know the various strategies and managements carried out in the great pandemics during history, in order to be able to take preventive measures to avoid future pandemics and anticipate preparing the health services and the socioeconomic organization at the time of face a pandemic. This is why we have taken as an example the epidemics that occurred in Chile and Italy as an example of good health management and control of epidemics in areas where malaria and cholera were endemic for hundreds of years<sup>20</sup>.

Understand What is the role of the history of medicine in the human sciences? It is key when defining strategies and methods to make adequate and correct decisions when facing a pandemic. Below are examples of how historical and social circumstances directly affected and generated the first outbreaks, epidemics and major pandemics in the history of humanity and what measures and the consequences that were taken in each historical time to deal with pandemics<sup>14,41</sup>.

## **Methods**

We conducted a scoping review of the literature about the history of pandemics and epidemics, following the Preferred Reporting Items for Systematic review and Meta-Analysis extension for Scoping Reviews (PRISMA-ScR) guidelines. A scoping review protocol was designed before starting the search based on the approach suggested by Arksey and O'Malley and the Joanna Briggs Institute. The PRISMA-ScR checklist and the protocol are available in the supplementary materials<sup>50</sup>.

## **Evidence acquisition**

This literature review aims to illustrate, compare and discuss the mechanisms through which pandemics affect social development and long-term health systems. To achieve

this goal, we adopted the Preferred Reporting Items for Systematic Reviews and Meta-Analyses [PRISMA] methodology. First, we define a list of keywords that express the main aspects of the concepts of ‘pandemic’ and second, we create the search strategy based on the mesh terms [[‘history’[Subheading] or ‘epidemiologic//history’[All Fields] and pandemic [All Fields] and [‘Italy’[MeSH Terms] or ‘Italy’[All Fields]]] and [‘2017/03/07’[PDat] Chile: ‘2022/03/05’[PDat]]. Only those articles whose language was not English, Spanish or Italian were excluded. Once the information was obtained, a critical documentary analysis was made of the articles referenced by two independent observers, from whom the name of the authors was hidden. The original documentary archives of the national archives in Chile and Italy were searched, respectively, in order to obtain the primary sources for later analysis.

### **Information sources**

Our search included standard databases and additional sources of information. Standard databases included the following: PubMed, Epistemonikos, Lilacs, Scopus and Google scholar Scoping Review was carried out in the last seventy years. We also searched in: Memoria chilena, Archivo nacional, Biblioteca Nacional with inedit books and documents, and Scielo. Finally, we made direct contact with local health stakeholders, including policy makers, clinicians and service users via email.

### **Search strategy**

In order to make our search as comprehensive as possible, we included terms related to without language or time restrictions. We used terms such as [‘history’[Subheading] or ‘epidemiologic//history’[All Fields] and pandemic[All Fields] AND [‘Italy’[MeSH Terms] or ‘Italy’[All Fields]]] and [Chile: ‘2022/03/05’[PDat]].

### **Selection process**

Two reviewers screened titles and abstract independently and compared them against inclusion criteria. Disagreements were solved by consensus or discussion with a third reviewer if consensus was not achieved. The seven main pandemics were selected based on the impact regarding deaths and the sociopolitical changes that they entailed in their time and that modified our way of seeing the world. There were reviewed publications on the subject in Spanish and English in databases of PubMed, Google Scholar, SciELO and Latindex from 2000 to 25 May, 2020.

### **Eligibility criteria**

My current recommendations,<sup>48</sup> the inclusion criteria of scoping reviews should be based on the mesh terms that can answer the questions under study, and the concept

to be examined and the context in which the review takes place. In our review, we applied the *following inclusion criteria*:

- **Primary Historical Studies:** Three main questions were structured: Three broad questions were structured, which were: What were the key milestones that started the great pandemics of humanity?, What were the most important measures that were taken to be able to deal with them? And And what were the consequences that they had in the history of humanity and the role that medical education had in the measures that were implemented at the time of ending the pandemics? Taking into account the mesh terms: ‘Mortality’, ‘Lethality’, ‘Pandemic’ & ‘Epidemics’; focusing on the implementation of hospital centers and the measures they took to solve the problems of overcrowding, mortality and lethality inside.

- **Secondary historical studies:** Autobiographies, historical writings (books and articles-letters) and comments, tributes, photographic archives, legal codes of the time and their translations, study articles, and academic programs following the scoping review methodology with the questions raised were considered. among this group. Anticipating a low number of studies, we kept our review as inclusive as possible; therefore, we include any type of study design, including qualitative analyses, case studies, and observational and analytical studies.

For the selection criteria of pandemics we create a impact factor indicator based in multinominal variable regression in union with 4) OPS-CENDES Method The OPS-CENDES method was proposed by a working group in Uruguay in the 1960s and was designed with a focus on the Latin American reality. Its purpose was to facilitate the prioritization of health problems in underdeveloped countries and for this same reason it places special emphasis on the economic effectiveness of the intervention, considering that the best intervention is the one that yields greater benefits at a lower cost. The PAHO-CENDES method is expressed with the following formula:  $(M \times T \times V) / CE$  Where M = Magnitude of the problem (e.g. number or rate of deaths and/or morbidity) T = Significance (e.g. value or social impact according to role or age of the affected population) V = Vulnerability of the problem (e.g. ability to avoid harm) CE = Cost/effect (e.g. cost of avoiding a death or case)

### **Prioritization matrix<sup>34</sup>**

The methodology of this study uses the OPS – CENDES method which uses 4 criteria: Magnitude, Significance, Vulnerability and Cost – effectiveness. Where each of them will have a score that will be described in the following table.

Criterion Definition Measurement scale

**Magnitude “Morbidity or mortality of older frequency”**

- 1: affects up to 29% of the population.
- 2: affects between 30 and 40%
- 3: affects between 41 and 50%
- 4: affects between 51 and 60%
- 5: affects more than 61%

**Transcendence or gravity****“Grade of impact of problem in the public health”**

- 1: affects only the individual.
- 2: affects the individual and family environment.
- 3: affects the individual, family environment, labor.
- 4: affects the individual, family environment, labor, community
- 5: affects the individual, family environment, labor, community, regional.

**Vulnerability “Feasibility of face the problem with the three levels prevention of the natural history of disease”**

- 1: It only requires educating the population.
- 2: Requires prevention and promotion.
- 3: Requires prevention, promotion and timely treatment.
- 4: Requires prevention, promotion and timely treatment, rehabilitation.
- 5: Requires a ministerial campaign.

**Cost-effectiveness “Relationship of amount of resources invested and the effectiveness of solve the problem”**

- 1: The situation remains.
- 2: Reduces the situation by up to 29%.
- 3: Decreases up to 30 and 40%
- 4: Decreases up to 41 and 50%
- 5: Reduces the problem by more than 50%.

**Data extraction and management**

We developed a data extraction based on the Standards for Reporting Implementation Studies Checklist and the framework developed by Proctor et al. Consequently, for each included study we extracted general characteristics, such as study type, country and participants, as well as methods and implementation outcomes, such as acceptability, feasibility, fidelity measures, effectiveness, cost-effectiveness and sustainability. A detailed taxonomy can be found in the Supplementary Materials. The data extraction was conducted by one of the team members and verified by another author<sup>50</sup>.

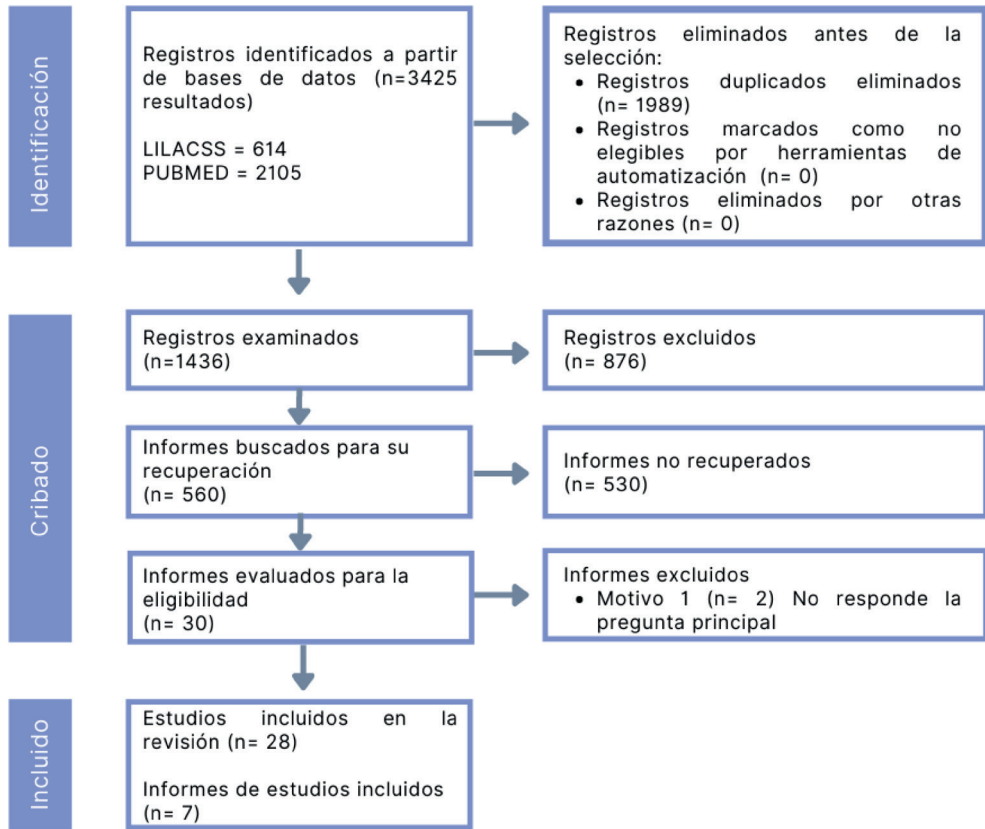


Fig. 1. Workflow Prisma. From: Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *BMJ* 2021;372:n71. doi: 10.1136/bmj.n71

Table 1. Scoping questions. The focus revision was based to this descriptive questions associated with *mesh terms*.

Question number	Research Question	Quotations that were used to answer these questions	Data Items
1	What were the key milestones that started the great pandemics of humanity?	1-10	[1]Pandemics in humanity [2]Epidemics dynamics
2	What were the most important measures that were taken to be able to deal with them?	11-29	[3] History of Pandemics [4] History Epidemics [5] History of Medicine [6] Health determinants [7] Socioeconomic Organization [8] Health System Organization
3	And what were the consequences that they had in the history of humanity?	30-47	[10]Ecosphere, biosphere and anthroposphere. [11] Chile-Italy.



## Evidence synthesis

We grouped the studies by the types of behavior they analyzed, and summarized the type of settings, populations and study designs for each group, along with the measures used and broad findings. Where we identified 27 primary studies, we counted the number of studies included in the review that potentially met our inclusion criteria and noted how many studies had been missed by our search. We analyzed 10 secondary studies, 12 primary historical resources and 5 parodistic articles (grey literature) who were included in the framework in this study.

The rise and fall of the great civilizations that have existed in the history of humanity and the continuous struggle between the West and the East has always been determined by the existence of epidemics and pandemics in the history of humanity, therefore understanding evolution of the epidemics and pandemics in the history of humanity, is indeed essential when taking the appropriate measures to prepare for new pandemics. As stated by Alvarez-Calderón, et al., in the study of Western historiography and military history they have realized this; academics such as McNeill (1978) have considered infectious diseases as “one of the fundamental and determining parameters of human society” (p. 2, own translation), while others affirm that epidemics and other natural catastrophes have become “external agents of change that shape history and culture”.

There are other authors who affirm that pandemics cannot be compared with each other due to the lack of incomparability between populations and the diverse sociodemographic characteristics existing between the different human groups that exist in historical time, however since Haegel in his treatises on and Kant in “Critique of Pure Reason” and the concept of *zeitgeist* affirm that it is not possible to extrapolate and use the data of local epidemics and pandemics since there are common characteristics of organization and way of life that transcend the historical time that has passed us by. touched to live Yuval Noah Harari in his books from monkeys to gods reveals the historical cultural evolution of the human being and the existing legacy between each of the cultural groups distant thousands of kilometers but that their contributions and discoveries impact us to this day associated with the great crises that humanity has experienced since its origins. In this sense we selected this 7 principal pandemics and epidemics in history for his impact and relevance proposal by Álvarez-Catalan & Botero-Murillo. In this review adjustment the first great pandemic with a Impact Factor= 35/60 it's the Plague of Akhenaton because this pandemic generated a change in the Egyptian state from a polytheistic theocratic regime centered on the priests of Amun to a monotheistic one centered on the sun god Aten, transmitting not only to the middle Egyptian empire but also to the Hittites, Crete and Mycenae. Sabbatini et al propose that it would correspond to a series of consecutive pandemics and not only according to the Mishnah and the Hebrew Torah records, proposing a series of not only epidemiological but social and political causes, while Habitch, as can be seen in table No. 2 and in the next historic relation.

## History of the pandemics of antiquity: from the epidemic in the government of the heretic pharaoh Akhenaten to the plague of the Hittites

During the reign of Amenhotep III, a schism occurred between the years 1347 to 1343 BC. The son of King Amenhotep III, who adopted the name of Akhenaten, established a monotheistic theocratic system, refunding the State and society, abolishing the old polytheistic theocratic system, leaving the God Aton [sun disk] as the most important God of the Egyptian pantheon from the time of the Middle Kingdom, moving the capital of the empire from Memphis to Amarna, from where the pharaoh's retinue annulled the power of the priests of the God Amun (see the table and complement information), which triggered a civil war and a social crisis, originating the first great pandemic of human history a possible outbreak of smallpox (*Variolla variola*) is postulated, it could also be typhus (*Salmonella tiphys*) or even tularemia (*Francisella tularensis*) which caused the death of a large number of people. This disease caused the death of tens of thousands of enslaved Egyptians. It is estimated that 43% of the burials correspond to multiple graves while 50% of the total present malaria inside their bones; This denotes that there was an epidemic outbreak among the Slaves who had fleas and ticks, which probably transmitted the deadly disease that is still an Enigma in our society, which is leprosy<sup>25</sup>.

*Amenhotep III, father of Akhenaten and son of Hapu: "[King Amenhotep III] had the desire to contemplate the gods [...]. His namesake replied that he could see the gods if he cleansed the whole earth of lepers and polluted people. The king was satisfied with this answer and ordered to gather all those who were in Egypt whose bodies were suffering from disease. In total there were 80,000. He then deported them to the quarries east of the Nile to work there separately from the rest of the Egyptians. Among them, adds Manetho, were some educated princes who had been affected by leprosy.*

*Flavius Josephus, in his work Against Apion*

In this primary historical font it's possible visualized the religion and magical thinking associated to the sin and the polluted people with affected with lepper in the time of pharaoh's akhenate, wich seppare to the rest of society and send to work in the stone in Amarna While the Egyptian slaves died in the quarries of Amarna, the kingdoms of Cyprus, Meggido, Canaan and the Kingdom of the Hittites also showed signs of this disease, which manifested itself with black spots on the body as recounted in the Egyptian Papyrus, while Hearst and in the London Papyrus it speaks of "the Asian disease", which manifests itself when the body is blackened with black spots<sup>1</sup>.

The constant commercial exchange between the Hebrew, Hittite and Cretan peoples, took advantage of the rapid dissemination of the subsequent decade transmitted by rat fleas, with tularemia, the black plague and malaria itself being one of the key objectives to elucidate the causes of this epidemic that became a pandemic during the time of the Egyptian Middle Kingdom<sup>25</sup>.

This first pandemic in the history of humanity that affected as many nations as civilizations transcends time and lays the foundations of classical culture by reducing the

power of Egypt and allowing the consolidation of the Canaanite, Hebrew and Semitic kingdoms, which, like Egypt was affected by epidemics, as the Book of Kings says, where Yavhwe punished David's sin by committing adultery with Jezebel and having extramarital relations with Solomon, killing 70,000 of the million healthy men of Israel and Judah; and later in the book of Micah the epidemic that claimed the lives of 185,000 Assyrians forced the King Sennacherib to withdraw from Judah without capturing Jerusalem, being the angel of Lord Gabriel who prevented the Assyrians from besieging and erasing them from the face of the earth, observing a clear relationship explained by magic and religion also observed in the Egyptians given their intimate contact With the Hebrews who were for many years the auxiliary army of the Pharaoh's borders, here is this relationship.

Once again, in the classical era, Greece rose as the leader and founder of a classical culture, initiating a cycle of splendor<sup>17,18</sup>.

### **The Plague of Athens by Thucydides and Sophocles framed in the history of the Peloponnesian war**

The creation of the Delian league by Athens and the Peloponnese by Sparta, after the end of the Medical Wars; The dispute over the hegemony of the Balkan Peninsula gave rise to the so-called Peloponnesian War where the victors of the Persian wars commanded by Pericles were able to rebuild the acropolis and the city of Athens with the taxes of the cities loyal to Athens caused a political and economic conflict between two great superpowers; that occasioned in the second year of the war in 430 BC the so-called plague of Athens where not only the Athenian peasants and citizens fell victim but also Pericles himself, he died shortly after contracting the disease<sup>15</sup>.

Just as he describes the symptoms of the disease with a descriptive rigor typical of the scientific method, Thucydides decides to become independent of religious beliefs and takes hold of the Hippocratic medical sciences, explaining that: "Suddenly they first had intense fevers that affected the head, redness and swelling of the eyes, and, inside, the throat and tongue became bloody and exhaled a strange and pestilent breath. Then, from these symptoms, sneezing and hoarseness ensue and, in a short time, the condition descended to the chest accompanied by a strong cough; when it fixed on the stomach, it upset it and produced vomiting of bile"<sup>240</sup>.

Finally after 26 long years of war and multiple deaths attributable to the so-called plague of Athens that could be bubonic plague, smallpox and even typhus as various sources say, Athens lost in the battle of Aegospotami by the Spartan army who a few years later was finally destroyed by the forces of the father of Alexander the Great, the lame Filippo II who finally designed the foundations of the Panhellenic dream that Aristotle proposed so much in his various writings and teaching<sup>9,12</sup>.

The greatest importance of this epidemic is that the first prevention, hygiene and public health measures are established, avoiding contagion and describing the concept of

group immunity that will be the bases of the first vaccinations and quarantines in the history of humanity theses the principal concept of apport the epidemics in Athens. Centuries later, the epidemics that occurred in Greek colonies added to the Roman colonies such as in Utica and Orosius in 125 AD until reaching the Antonine plague, so called because it occurred during the government of Marcus Aurelius, reached its maximum zenith in the empire of Justinian the 541 AD<sup>12</sup>.

These concepts are repeated by the historical disease described by Nietzsche in the Roman Empire with the Antonine plague (possible outbreak of typhoid fever) and the two outbreaks of the Black Death in the Byzantine era (576 AD), the so-called Justinian plague, which is maintained in the following two centuries what was accelerated by environmental inclemencies, massive eruptions, and months of darkness, returning to the magico-religious conception of the preclassical period since the plague was explained by the scourge of God due to the lack of faith and the debauchery caused due to the barbarian invasions and the relaxation in masses and liturgical activities, ending the pandemic when Pope Gregory the Great said he had seen the archangel Saint Michael at the top of Hadrian's pantheon founding the castle Saint Angelo in honor of the archangel Saint Michael who defeated the devil and expelled him from paradise, the analogy disease=pestilence=epidemic=death is equivalent to the demon, the primitive snake that is stepped on and its head cut off by the sword of divine justice of the Archangel Saint Michael who conquers death over evil and recovers to the population giving up death after the period of processions and masses which probably accelerated the spread of the epidemic given that it generated the R0 or index ratio necessary to spread the pandemic to the rest of the social strata, which would have finally caused an increase in the inertia of the system, causing multiple local epidemics over time which Finally, they did not allow the sociopolitical and economic stability of the government of Justinian, Theodora and Belisarius to be perpetuated in Western Rome, thus strengthening papal power in the West and above all giving the gateway to Arab unification in 632 AD with Muhammad. losing influence on the entire Mediterranean coast, since according to, this uncontrollable outbreak of *Yersinia pestis* claimed the lives of 40% of the city's population and followed the trade routes created by Belisarius and the Basileus archons in Constantinople and exterminated perhaps a fourth part of the European population south of the Alps in 544; when it finally ended, more than 25 million people had perished. Probably if the polemarchs and basileus in this christian era are implement the measures in box 3 detect, isolate, test, treat each case and trace their contacts, prepare critical units and hospital bed capacity, protect and train health workers, communicate the risks to the population and how they can protect themselves, reduce transmission through proper handwashing, self-care, and burning contaminated clothes and disinfected grains, levied the consume of aliments contaminated with *Yersinia pestis* for example *ratus*<sup>51,52</sup>.

Take care of others because we need them by avoiding large crowds and unnecessary international travel, it would have been possible to control the local epidemics of Black Death and thus not to have developed the dreaded Black Death pandemic in Europe being the pandemic with the highest impact factor with a value of 47/60 points due to the magnitude, invasiveness and the change in the rate of contagion over time which will be presented in the following historical overview<sup>52</sup>.

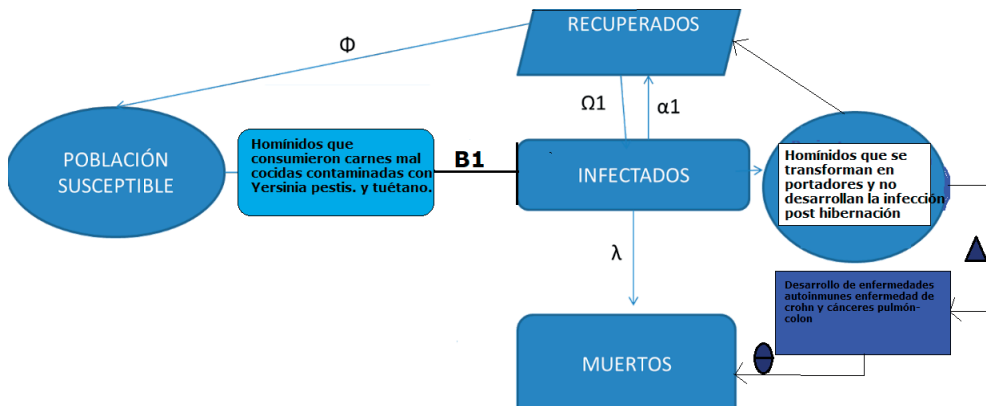


Fig. 2. The rising of black Death was found in neanderthal population and the consumed of poor cooking meat. Hibernation could be a mechanism to contain the disease and generate current autoimmune diseases such as Crohn's syndrome and lung cancer.

### The Black Death or Black Peast heir to the crusades and the discovery of the Silk Road

The plague, according to the Arab author Ibn al-Wardi, may have originated in the "Country of Darkness", the khanate of the Golden Horde, developed between 1346 and 1353 and it is estimated that its arrival took place between 75 to 200 million lives which forever changed the fate and way of life from the Middle Ages to the age of the Renaissance and subsequent Humanism<sup>9</sup>.

The discovery of trade routes to the Middle East and the idea that the Garden of Eden was in India led the first Europeans to enter the interior of the Asian continent and come into contact with cultures and ways of life different from those they knew them. The crusading campaign had allowed stable trading posts located in the Middle East to leave, would have led the khanate forces to invade prized areas and finally brought in soldiers killed by the Black Death, catapulting bodies inside the walls of Odessa, who carried the fleas of the plague, infecting English and Venetian merchants, who carried the black rat fleas on their ships and clothing to their cities of origin the main Italian commercial cities. The plague first devastated the incipient cities, transmitting first to the villains and then to the bourgeoisie in the



Fig. 3. Costume of the plague doctor. The plague doctor wore a black hat, beaked white mask, which contained aromatic substances to block out the smell of decaying bodies, and a waxed gown. The rod or pointer kept afflicted patients away. The earliest version of a protective hazmat suit. Courtesy National Library of Medicine.

nascent Italian cities, generating high mortality due to the dense dependence and the sanitary conditions in which Europeans lived, which was maintained in Italy. and in Chile until the beginning of the 20th century, lacking adequate sewage networks, latrines and wastewater evacuation routes. This generates high mortality in large cities, causing declines to half of the population, as is the case of Siena and the area of Tuscany where practically between 50 and 60% of its inhabitants died as a result of the plague, this caused in subsequent decades an increase in the number of peasants suitable for medium-sized dwellings, the large fiefdoms lost their owners and allowed the incipient bourgeoisie to settle and occupy the estates and places of the old feudal lords developing and allowing the dissection to anatomical and founding the anatomy of modern science<sup>9</sup>.

*What can be said or told about this [now leaving the region and returning to the city], except that so much and such was the cruelty of heaven, and, in part, of men, that between the month of May and the following June, due to the virulence of the disease as well as the little diligence that was done about the sick, it is believed and affirmed that within the walls of the city of Florence more than one hundred thousand human creatures were snatched from this present life, a number that, perchance, before that unfortunate accident occurred,*

*was not thought to exist in all of it? Oh, how many great palaces, how many beautiful and well-built houses, how many noble rooms and dwellings, filled and populated with noble dwellers and great lords and ladies, from the greatest to the least servant, were left empty and alone! How many families, how many excellent lineages, how many large and rich inheritances and possessions, how many and how precious riches were seen, without heir and legitimate successor, abandoned! How many brave and noble men, how many and how beautiful, graceful and gallant ladies, how many gentile and cheerful gentlemen who, not in the opinion of the common people, but that of Galen, Hippocrates and Aesculapius, would be judged well complexioned and healthy, in the morning they ate with their companions and friends, and at night they dined in the other world, with their ancestors!. Boccaccio, Giovanni. Decameron. Barcelona: Editorial Planeta, special edition for EPENSA, National Journalistic Company; 1999.*

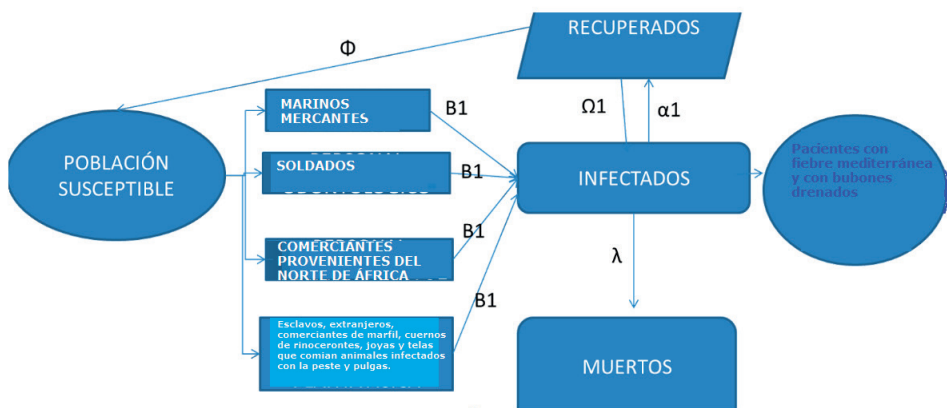


Fig. 4. The waves of variants and strains of the Black Death from the time of Justinian until the Great Black Death decimated the Byzantine population and probably caused the Roman Empire to not return to its original peak due to the large number of deaths caused by its arrival.

### The Case of Good Management Epidemic Control: The Cholera in Italy & The Malaria's Campaign in Chile

While Chilean began its independence process, the young Italy submitted to the Austrian absolutist yoke and distributed in the papal states, simultaneously began its independence process initiated by Giuseppe Massini, with the Young Italy manifesto, who settled the bases of the independence process that will be finally carried out by the leader of the red coats Giuseppe Garibaldi and King Victor Emmanuelle King of Italy, who after the battle of Magenta and Solferino [1874-1876], achieved the definitive victory over the forces Austrian and Bourbon, and the definitive expulsion beginning a long path of unification, where social differences, inequities, poverty and injustice caused by the years of war contributed to the appearance of epidemics in the main Italian cities accompanied by other epidemics such as malaria, tuberculosis and variola, which forced to modify the planning urban based on the deterministic sanitary thesis supported by Virchow, transforming the streets into true sanitary cor-

ridors analogous to the circulatory system, building sewage systems, bridges, dams, channeling rivers and sanitizing poor neighborhoods where rodent and lice plagues reigned, being eradicated by the state health system and a group of scientists from the universities of Turin, Padua, Federico II Naples, Siena, Salerno and the Sapienza of Rome, who left a legacy that transcended borders and reached Chile at beginning of the 20th century with Dr. Giovanni Battista Noé Crevanni, known as Juan Noé [Pavía, Italia, 27 de abril de 1877 - Santiago de Chile, 22 de enero de 1947] who with his ark brought all the innovations and techniques for the control and isolation of pests through the introduction of fish and zoological species in order to control the *culex pipiens* mosquitoes that carry the malaria and yellow fever managed to definitively eradicate by applying the knowledge of the to anatomy, biology, physiology, zoology and botany, controlling the epidemics inherited from the Pacific war<sup>37,42,47</sup>. We find Juan Noé Crevanni's immediate antecedent in the fight against Cholera.

### **The great mortality in the plague of Naples: cholera Italy: union, strength, freedom! The Risorgimento!**

Despite the projects for an urban remodeling of the city, and despite the fact that cholera had broken out three times in less than twenty years [in 1855, 1866 and 1873], in September 1884 a new epidemic spread, with extreme violence in the popular neighborhoods, due to congestion and insufficient sewerage network, and also spreading to a lesser extent to the rest of the city.

Italy had a political organization according to which the different republics within it had autonomy and were unable to form a unified state. Italian regions and cities were divided into different kingdoms and duchies, ruled by different monarchies and foreign states. In the south, the Kingdom of the Two Sicilies - made up of Naples and Sicily - was ruled by the Bourbon dynasty. The center of Italy, including Rome, the former imperial capital, was dominated by the Pope - the Papal States. While Parma, Modena, Tuscany, Veneto and Lombardy were ruled by Austrian princes.

Since the 1830s, there were revolutionary groups in Italy that sought to achieve the political unity of their territory. For this, two principles were of special importance: Nationalism, which translated into expelling the Austrians who occupied northern Italy and uniting the Italian provinces; and Constitutionalism, which implied ending monarchical absolutism.

Giusseppe Mazzini organized the secret society called "Young Italy", from where he advocates unity under a nationalist government. Mazzini's effort failed. Years later, the king of Piedmont-Sardinia, Vittorio Emmanuelle II [1820-1878], initiated the long-awaited unity. For this he had the collaboration of his Prime Minister, Camilo Benso, better known as Count of Cavour [1810-1861]. In 1848 the Events in Naples led to the establishment of a constitutional monarchy, the flight of the Pope. Lombardy-Veneto against the Austrians. Constitutional Monarchy in Piedmont.



The battles of Solferino and the Magenta fields over the pro-Napoleonic Austrian and absolutist troops, meant Italian unification and independence, finally causing the definitive expulsion of the Austrians, but with the respective losses of human lives and the pauperization of the quality of life and the plagues that devastated the rest of the Italian regions during the 19th century.

During all these years of witnessing the duel between life and death, I have gotten to know both combatants better. At first, when I saw death at work in the hospital wards, it was a simple fight between two, a children's game, compared to what I saw later. In Naples I have seen her kill more than a thousand people a day before my very eyes. In Messina I saw her bury, in a single minute, more than a hundred thousand men, women, and children, under the sinking houses. Later in Verdun, I saw her, her arms bloodied up to the elbows, with four hundred thousand men and reaping the flower of an entire army on the plains of Flanders and the Somme. It was only by seeing her operate on such a vast scale that I began to understand something of his war tactic. Munthe, Axel, *The History of the abbey of San Michele*, Ed. Youth, Provence, 101. Barcelona; 1972

In 1834, Giuseppe Garibaldi became part of Mazzini's Young Italy movement, rising to the category of leader and earning the stripes of captain in the Piedmont Navy.

### **Giuseppe Garibaldi enters Naples**

In 1859 battles of Magenta e Solferino, which took place in 1859 he fought in northern Italy against the Austrians. In 1860 he landed in Sicily with the Red Shirts and in a swift campaign expelled the Bourbons from the island and from Naples, which he offered to Vittorio Emanuele II. He tries to incorporate Venice and Rome, but fails due to opposition from the Piedmontese army itself. Veneto was ceded to France by Habsburg Empire after the III War of Independence, and then France in 1866 handed it over to the nascent Kingdom of Italy.

Venice he invades Rome but does not hold his possession against the French imperial army. The last great undertaking of his, the defense of the French republicans against the Prussians in the war of 1870-1871. During this same period, discoveries were made regarding the mechanisms of transmission and dissemination of cholera, as described by a doctor of the time:

*The malattia, with an incubation period of 1-5 days, manifests itself with sudden and intense diarrhea with scariche always più liquide and colorless, and also with enormous loss of liquid, calcium and potassium. Follow the vomiting that aggravates the dishydration status. The transmission does verify perchè il vibrione, eliminated with the feci, it is not distrutto, due to the lack of the liquid purification system or the water purification system, because it can arrive there healthy, through the food and drink.. Dino Rabai: La Scintilla del Progresso: Pier Luigi Bretti's life of a vigevanese sindaco dell'ottocento through i verbali del consiglio comunale e altri pubblici documenti. Società storica vigevanese-Collana Library n.7, June 2014.*

The importance given to hygiene and decoration and to the purification of water in Italy was decisive in controlling the epidemics in Naples and the outbreaks in the towns, avoiding contact between feces and sewage.

### **The smallpox pandemic in the world and the situation in Chile**

The beginning of the history of immunizations dates back to the Indian and Chinese civilization. Records from around the 7th century AD have been found, which show that Buddhist monks would have ingested snake venom in order to generate immunoglobulins and thus neutralize the toxins of snake venom. In parallel, the Chinese would have used pustules and scabs from people infected with smallpox to administer them through cuts in the skin of the forearm of healthy people, with the aim of preventing them from contracting smallpox or developing attenuated forms of the disease<sup>40,41</sup>.

Later, it was Edward Jenner who is credited with the first modern variolation technique using the term vaccinate by inoculation. Later, in 1765, the friar Pedro Manuel Chaparro was the first to inoculate smallpox pus within Chilean territory, being one of the pioneers of inoculation in Chile. However, the first smallpox vaccines were sent to Chile, only in 1805, by Rafael de Sobremont, Viceroy of La Plata. There was a great social rejection by the Chilean population to the inoculation of this vaccine, in this context the Catholic Church played a key and active role in spreading the acceptance of the vaccine and the loss of fear of it<sup>23</sup>.

Around the year 1885, while in the Northern Hemisphere the vaccine developed by Louis Pasteur against rabies had become a great success, in Chile, there was still discussion about how vaccination campaigns should be implemented, since our country suffered several smallpox epidemics and there were more vulnerable human groups, which presented epidemic outbreaks of typhoid fever, cholera and chavalongo (*Salmonella typhi* o Typhi), due to the scarce and very poor sanitary conditions in which they lived. In this sense, in 1887, the then president, Mr. José Manuel Balmaceda, enacted the Compulsory Vaccine Law and the General Health Ordinance, being the first universal and compulsory vaccination project in Chile, thus establishing a General Health Board destined to advise to the government in these matters, however, it should be noted that this project had numerous opponents ranging from prominent intellectuals to liberal parliamentarians, who considered that vaccination was an attack on individual freedoms, in addition to being a failure<sup>5</sup>.

Then, in 1892, the Institute of Hygiene was founded by Jorge Montt Álvarez, President of the Republic and of the Government Board at that time, the establishment functioned between 1892 and 1924<sup>5</sup>.

At the same time, Chile is one of the forerunners of the bases and foundations of public health in the American Continent, due to the creation of a vast network of

chemistry and bacteriology laboratories, disinfection offices, serum therapy pavilion and serum section and vaccines, with anti-rabies vaccination services and preparation of anti-diphtheria serum, this allowed Chile to establish itself as a model for the other countries of the continent<sup>33</sup>.

The 20th century were fruitful years in the scientific field in Chile. Between the years 1943-1944, a group of outstanding researchers from the Bacteriological Institute with the support of the United Nations managed to establish one of the industrial production plants for penicillin, which meant great advances for public health in the country<sup>9</sup>. In 1954, doctors Eduardo Fuenzalida Loyola and Raúl Palacios von Helms presented the same anti-rabies vaccine that is widely used today. Later, in 1978, the National Immunization Program was created at the national level, based on the Expanded Program on Immunization [1974] proposed by the World Health Organization [WHO] and the Pan American Health Organization<sup>34</sup>.

Later, in 1979, the Bacteriological Institute of Chile was legally succeeded by the Chilean Institute of Public Health [ISP], a regulatory and supervisory institution dedicated to quality control of medicines and medical supplies used in the country and to encourage research through consultancies and inspections. In this aspect, the production of medical supplies went into the background, even leading to various controversies, due to what it means to be a regulator and qualifier of quality standards of the products created by the same institution, consequently causing the abandonment in the production of sera, vaccines and medicines by the ISP<sup>39</sup>.

Currently, in the context of the SARS COV-2 pandemic, whose arrival in Chile was confirmed on March 3, 2020, there was an accelerated development of science, since in record times, various vaccines were created, tested and approved. that mitigate the symptoms of coronavirus. The first shipment of these vaccines arrived in Chile on December 24, 2020, thanks to the proactive management of the government in power. In this way, Chile positioned itself as the country with one of the fastest vaccination campaigns in Latin America, and the world<sup>3</sup>.

### **Malaria in Chile: Legacy of the Pacific War, a result of poor sanitation conditions**

In Chile, malaria has been restricted since ancient times to the Province of Tarapacá, located in the far north of the country, a region with desert characteristics, a territory that was under the control of the Chilean Government after the Battle of Arica on June 7, 1880. in the context of the Pacific War. In this way, the desert opened up a new field of geographical problems and challenges for Chileans.

Arica, a city in the Province of Tarapacá, is located between the mouths of the Lluta and Azapa rivers. In the summer months, the flow of these rivers increases, which favors the formation of slopes and urban swamps that predispose the settlement of the mosquito of the *Anopheles* genus, the main vector of malaria. Around the year 1910,

Arica had precarious water supply conditions, which consisted of wells whose supply came from underground contributions from the river, most of the houses had private wells, whose cleaning was carried out irregularly, and only of eight public wells, those that were outdoors and dirty. For this same year, 790 cases of malaria patients were reported in Chile, which were distributed in 49 hospitals in Chile, serving approximately 70% of patients in the San Juan de Dios Hospital in Arica, it is relevant to mention that that The hospital had a significant deficit of health personnel, who had to attend to the large Arica population and its surroundings. In addition, the infrastructure and equipment of the Hospital was precarious in relation to the large population that it had to serve.

In 1913, the Italian doctor Giovanni Noé Crevanni, a year after his arrival in Chile, addressed the study of Malaria in the northern part of the country, particularly in Arica. Dr. Noé, committed to the country, directs his studies to face the serious health problem caused by Malaria and was one of the first to emphatically make harsh criticism about the indifference and bureaucratic disinterest of high authorities, legal resources, economic and human resources necessary to confront this Epidemic.

*If the money had not been lacking, at this time, surely the authorities would have helped the owners of the 'Chimbas' to carry out the essential hydraulic hygiene works...; the Hospital would have a Laboratory for microscopic examinations...; the fight against malaria would have been organized from its prophylaxis to the cure of chronic malarial patients [which is] the generator of so many subsequent diseases up to the physical and intellectual degeneration of the race.*

*El Ferrocarril newspaper dated 03/04/1913, Dr. Giovanni Noé Crevanni*

Committed to the country, Dr. Noé Crevanni carried out an anti-malaria campaign, directed by himself on the ground. The campaign had two main objectives: the extinction of larval anophelesism and the cure of chronic malaria. To achieve the first objective, various measures were adopted that sought to eliminate those areas conducive to the proliferation of the mosquito, river sanitary squads were created, collector channels were built for water from springs or spillage from ditches, among others, in this way with the work carried out considerably decreased anophelesism. On the other hand, to achieve the second objective, health police squads were organized, which were distributed to various localities in the Tarapacá area, where they carried out cures at home and also went to public schools. The campaign achieved full success in 1945, after 32 years of intense work and study. The broad and accurate vision of Dr. Noé was key to the eradication of the country, thus rendering an invaluable service to his adoptive country.

Can you see the campaign against the Malaria in Chile directed by Giovanni Battista Noé Crevanni based in the model eradication of cholera and Malaria in the old world (Italy-Naples): <https://www.cclm.cl/cineteca-online/campana-antimalarica-en-arica/>  
Second link: <https://youtu.be/dowYDbT3Ghg>

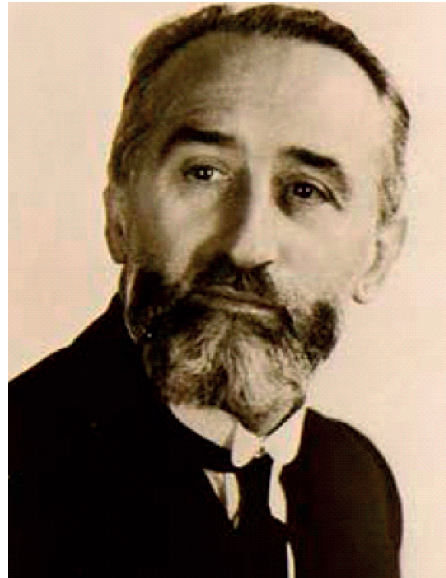


Fig. 5. Italian Physician Giovanni Noé Crevani. Corp. Recalcine Photograph Archievement.

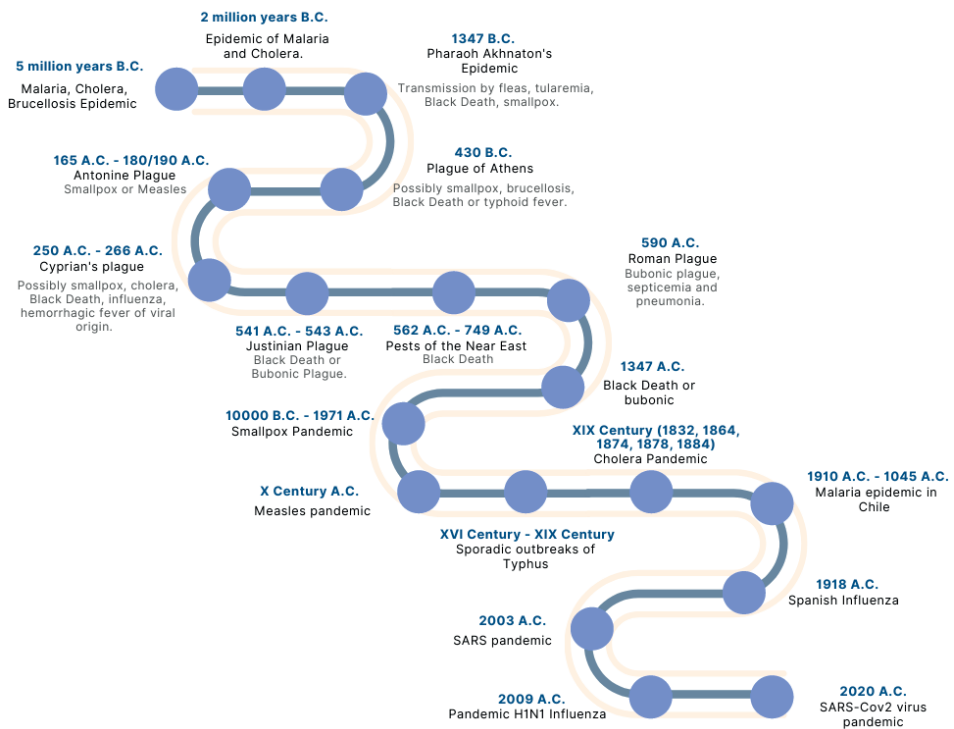


Fig. 6. Mapamundi A, Timeline the History of Pandemics and Epidemics. In: Humanity and Medical Education and new preventive model proposals to Pandemic. BC: Before Christ; AC: After Christ Property elaboration.

## Box nº2. Summary to principal Pandemics and Epidemics in History of Humanity and their consequences

Pandemic Historical Milestone	Start of the Pandemic	Measure taken to control the Pandemic	Finished pandemic	Consequences	References
The Plague of Egypt during the rule of Akhenaten	1337-1334- Amarna 300 km north of Cairo, Egypt. Akhenaten's government. Possible transmission by fleas and ticks among the 80,000 Malaria-infected builders of the new capital city of the empire.	The lepers, the infected and any stonemason who was infected were isolated. Once they died they were quickly buried and covered with lime in multiple graves. The priests and doctors performed rites and invocations to their gods with medicinal herbs and pointments to relieve the pain of the sick.	The spread of the epidemic to other cities led to the massive death of all the workers in the Amarna quarries, which probably generated an endemic disease in the territory itself. It was the same deaths that limited the growth of the epidemic that became a pandemic when it spread to Cyprus, Crete, Canaan region and the Hittite Middle East empire.	Possible fall of Tutankhamun's reign and the end of the Middle Kingdom, social changes in the Hittite empire of its rulers and political, social and economic instability that was accelerated by the wars against the Egyptians.	de Rivero, D. A. T. (2021), Habicht, Eppenberger and Rühl, (2021), Abdel-Aziz, S. M., Aeron, A. and Kahil, T. A. (2016) & Lull, J. (2021)
Athens Plague	Possibly in Ethiopia, according to Thucydides, he refers that the Ethiopian slaves brought in a ship to the port of Piraeus spread the epidemic among the merchants of the port and from there it spread to Corinth and the other cities allied with Athens.	The sick were isolated, the doctors who treated the sick died early and those who survived generated immunity, The infected were thus totally neglected, their family and friends avoided contact for fear of becoming infected, and the few charitable souls who came to their aid they end up falling victim to the disease, thereby contributing to its greater and more rapid spread throughout the city.	It is estimated that between 70,000 and 100,000 people died during the two waves of the epidemic that occurred in 430 and 427 BC. The military power of Athens was greatly diminished, to the point that the army was unable to carry out major operations for fifteen years. Although the Athenians achieved some victories against Sparta, the loss of so many sailors and soldiers made it impossible for them to hold on and they surrendered in 404 BC. after the defeat of the Aegospotami.	The impact of the disease was far greater than it would have been in times of peace, for the city was crowded with peasants who had moved to the polis in search of refuge and who became its main victims. The temples and camps in which these exiles settled were soon filled with the dead, left by the state to rot, and this changed the hierarchical structure of Athens and gave rise to the so-called tyrannical or puppet governments set up by the Lacedaemonians in Athens, which lasted 30 years and eventually led to the fall of Athens and later of Sparta to the Macedonians.	Moreno, E. (2014) Pybus, O. G. et al. (2012) & Cervera, F. (2021)
The Black Death in Europe	According to Ibn al-Wardi, it may have originated in the "Country of Darkness", the khanate of the Golden Horde, developed between the years 1346 to 1353. The pandemic originated in Central Asia or East Asia but its first definitive appearance was in Caffa in Crimea in 1347. From Caffa, it was most likely carried by fleas living on black rats traveling on Genoese ships, spreading throughout the basin the Mediterranean and reaching Africa, western Asia and the rest of Europe through Constantinople, Sicily and the Italian peninsula in the time of Crusaders.	Close contacts are isolated, doctors use special suits to avoid contact with patients with long noses with medicinal herbs that are burned inside. People migrate to the countryside to avoid contact with big cities, however they disperse the contagion. Social gatherings are reduced and bodies are quickly buried or cremated in ossuaries.	Given that there is no clear record of deaths from the Plague pandemic, which date back to values between 7 and 70 million people, the epidemic ceased due to death itself and the shortage of people to reach the effective R0 and was expanding to other cities or more populated areas sprouting in waves in London, Paris, southern Spain, Portugal, and cities in the Middle East, it only stopped once the quarantines were done well.	It is estimated that their arrival took between 75 to 200 million lives and changed forever the destiny and way of life from the Middle Ages to the Renaissance age and later Humanism, changing feudal society to a mercantile society where the commoner could own land and the bourgeois replaced the feudal lord, the beginnings of capitalism and the foundations of modern society were born from medieval times.	Ponti, G., D'Onofrio, F., Ruitni, C., Muscatello, U. & Tomasi, A. (2015) Glatter, K. A. and Finkelmann, P. (2021) Imperato, P. J., Imperato, G. H. and Imperato, A. C. (2015) Rubini, M. et al. (2016)

Pandemic Historical Milestone	Start of the Pandemic	Measure taken to control the Pandemic	Finished pandemic	Consequences	References
Smallpox pandemic	<p>The origin of smallpox is lost in prehistory. It is thought to have appeared around 10,000 BC, at the time of the first agricultural settlements in northeast Africa and is subsequently thought to have spread to India via ancient Egyptian traders. The earliest evidence of smallpox-like skin lesions is found on the faces of mummies from the time of the 18th and 20th Egyptian dynasties. At the same time, smallpox was reported in 1122 BC in China and is mentioned in ancient Sanskrit texts from India. Smallpox was introduced into Europe sometime between the 5th and 7th centuries and was a frequent epidemic during the Middle Ages. The early stages of the decline of the Roman Empire coincided with a major epidemic: the Antonian plague, which killed nearly 7 million people.</p>	<p>The first methods of smallpox (<i>Variolla variola</i>) control that are recorded in ancient Egypt associated with the use of medicinal herbs. It was common knowledge that smallpox survivors became immune to the disease. Already in the year 430 a. C., smallpox survivors were called to care for the afflicted [9]. The man had been trying for a long time to find a cure for the "speckled monster". During medieval times, many herbal remedies, as well as cold treatments and special cloths, were used to prevent or treat smallpox. Dr. Sydenham [1624–1689] treated his patients by not allowing a fire in the room, leaving the windows permanently open, placing the sheets no higher than the patient's waist, and administering "twelve bottles of small beer each." twenty-four hours" [ 10].</p>	<p>In 1958, the Soviet Union proposed to the WHO a global campaign to eradicate the disease and from 1967 efforts were intensified to eliminate smallpox with massive vaccination campaigns, until officially certifying its end in 1980.</p>	<p>Between the fifteenth and twentieth centuries with the arrival of the Spanish conquerors in Mesoamerica and South America the pandemic also led to the collapse of pre-Columbian Mesoamerican civilizations, along with the fall of the Inca empire and the Chancay, Chimu, Patagonian and Polynesian indigenous cultures. In the twentieth century, it was the first viral pandemic to be eradicated thanks to the combined efforts of the United Nations, the USSR and third world countries that adhered to mass vaccination against smallpox. The smallpox pandemic claimed many lives; it is estimated that in the 20th century alone, smallpox killed up to 300 million people and 500 million in its last 100 years of existence.</p>	<p>(Riedel, 2005)(Sáez, 2016) (Riedel, 2004), (Gross and Sepkowitz, 1998)[18] (Henderson, 2011) (Kruif,P.1996)(History of smallpox, 2021)</p>

Pandemic Historical Milestone	Start of the Pandemic	Measure taken to control the Pandemic	Finished pandemic	Consequences	References
<p>The great cholera epidemic in Naples</p>	<p>A guide to the content of the dossier "1885, Cholera in Naples"</p> <p>In a hot summer at the end of the 19th century, cases of cholera began to be reported in Mediterranean ports. As a medical text says, "The disease, after an incubation period of 1 to 5 days, manifests itself with sudden and intense diarrhea with increasingly liquid and colorless secretions, and therefore with enormous losses of fluids, calcium and potassium. Vomiting follows, aggravating the state of dehydration. The transmission occurs because the vibrio, eliminated with the feces, is not destroyed, due to deficiencies in the wastewater treatment system or water purification, so that it can reach healthy humans through food and drinks. A few weeks after the first reports, the outbreak of the epidemic in some popular neighborhoods of Naples, where not only are the "water purification and purification" systems very primitive, if not non-existent, but where the general urban conditions border on the impossible: dwellings that from ground level climb up stairways and tunnels, to build environments often devoid of direct light and air, and with a population density that in some parts of the Porto area reaches 2,600 inhabitants per hectare. To this is also added the socioeconomic system, with an "alley economy" within which are the residence, the productive activities, including the micro-industrial ones with the use of toxic substances, the trade including food and the wholesale trade with a confusing system warehouse and the like. supply and distribution network.</p>	<p>The appalling levels of mortality provoke a national debate, which will result, among other things, in the special law for the rehabilitation of Naples, in the relative master plan of the city, and later in the national extension of some measures, considered useful for Intervene in cases of severe urban sanitation conditions, such as the construction of bridges, dams, sewers, sewage collection systems and houses under horizontal construction</p>	<p>A government intervention was designed to definitively solve the old ills of the city. Agostino Depretis, President of the Council, then solemnly declared that it was necessary to "sventrare Napoli" [literally, "to gut Naples"], thus coining the neologism sventramento [inspired by the reading of "Il Ventre di Napoli" by Matilde Serao] which means "demolition" and was applied from that moment to the main urban remodeling operations;<sup>2</sup> and was later extended to all similar urban interventions carried out in Italy in these years.</p> <p>On the occasion of the visit of King Umberto I to the citizens affected by the disease, there was talk of the remodeling of popular neighborhoods. The main supporters were the foreign minister Pasquale Stanislao Mancini, the mayor Nicola Amore and Agostino Depretis, the strongest advocate of a radical demolition of the areas most affected by the epidemic.</p> <p>It was then that the main interventions to be carried out were outlined, among them the creation of an efficient sewage system, obtaining an abundant supply of water, the remodeling of popular neighborhoods [which would be obtained with a main street from the Central Station to the center of the city and a smaller road network that would favor the circulation of the sea breeze inland] and the creation of an expanding neighborhood to the north of the city.</p>	<p>When cholera broke out in Naples in 1911, the civic government commissioned Giuseppe Moscati to conduct public health inspections and to investigate both the origins of the disease and the best ways to eradicate it. This he promptly did, presenting his suggestions to city officials. To his satisfaction, most of these ideas were put into practice by the time of his death. And after the development and discover of biochemical mechanism validated by Saint Guisepppe Moscati must be explained the epidemiological phenomena in Naples and the rest of the world</p>	<p>Imperato, P. J., Imperato, G. H. and Imperato, A. C. (2015) &amp; (Noè G.,2016)</p>



Pandemic Historical Milestone	Start of the Pandemic	Measure taken to control the Pandemic	Finished pandemic	Consequences	References
The Spanish Flu	From 1918 after World War I, influenza A associated with the H1 N1 strain of influenza likely began in the southeast of the East China city, which resulted in the deaths of 100 million people according to various sources which was first notified time in Spain being that the other powers are probably from France, those llamas at the time of those who came to work in Spain brought the plague and spread it causing the greatest mortality existing until the 20th century	Schools and universities were closed, new hospitals were built, the use of masks and glasses as well as gloves became mandatory. Mass quarantines were made and medical students were called to replace deceased medical personnel.	It is estimated that at the end of 1918, after the great mortality that occurred during this year, the slowdown and decrease in incidence and mortality in the countries that were affected, either due to the reduction in the contagion rate and the R0 necessary for the epidemic to continue expanding, taking around 100 million people.	The fall of the population in the countries that were involved in the First World War and in the nations that supported them provoked a behavioural change in the years to come, initiating the so-called Roaring Twenties, added to the restrictions taken at the Versailles Treaty Conference to restrict and demilitarise Germany, was the breeding ground for the emergence of nationalism and fascist movements throughout Europe and North America, generating disapproval and a fall in the economic activities of the countries that formed the Triple Entente and the Triple Alliance. It is estimated that every 50 years a new variant of influenza appears that does not generate immunity in the population due to mutations that are not recognised, as in the case of the epidemics in Hong Kong and the avian and swine flu epidemics in China in 2009.	(Martini et al., 2019), (Mossad, 2018), (Gaeta, R et al., 2020), (Økland and Mamelund, 2019), (Saul, 2018)
The malaria epidemic in Arica Chile	In Chile, malaria was restricted to the Province of Tarapacá, located in the extreme north of the country, a region with desert characteristics, a territory that was under the control of the Chilean Government after the Battle of Arica on June 7, 1880 in the context of the Pacific War.	Dr. Noé Crevani carried out an antimalarial campaign that had two main objectives: the extinction of larval anophelism and the cure of chronic malaria.  To achieve the first objective, various measures were adopted that sought to eliminate those areas conducive to the proliferation of the mosquito, river sanitary squads were created, collector channels were built for water from springs or spillage from ditches. On the other hand, to achieve the second objective, health police squads were organized, which were distributed to various localities in the Tarapacá area, where they carried out cures at home and also went to public schools.	The campaign achieved full success in 1945, after 32 years of intense work and study. The broad and accurate vision of Dr. Noé was key to the eradication of the country, thus rendering an invaluable service to his adoptive country.	Sanitary squads were created and the control of endemic malaria in the north of our country allowed the annexation and stabilization of the social and sanitary situation, which was unfinished and poorly controlled by the authorities of the time. It was the sanitary hero who succeeded and allowed the citizens of northern Chile to settle definitively and become the main producer and extractor of raw materials in the country.	[34] (Osservazioni microscopiche e deduzioni patologiche sul cholera... - Biblioteca dell' Archiginnasio, 2021), (Noé, A., 1981), (Noé, G.,

Box N°2. Description of the management and measures related to confront the epidemics in the World.  
 \* Property elaboration.

Measures and lessons we must learn for the Present and the Future
<ul style="list-style-type: none"> <li>• TTA (Test, Traceability and Isolation)</li> <li>• Detect, isolate, test, treat each case and trace their contacts.</li> <li>• Prepare critical units and hospital bed capacity.</li> <li>• Protect and train health workers.</li> <li>• Communicate the risks to the population and how they can protect themselves.</li> <li>• Reduce transmission through proper handwashing, self-care, and proper mask use.</li> <li>• Take care of others because we need them by avoiding large crowds and unnecessary international travel.</li> <li>• Receive contributions from the State to reduce mobility and the performance of unnecessary activities for 21 days to stop the logistics stage of the pandemic</li> <li>• Innovate and learn new testing techniques and implement and discover new treatments other than vaccines (immunotherapy, phage therapy, use of interferon, among others).</li> <li>• Environmental sanitation, reduce environmental pollution and exposure to industrial pollutants to the population and animals.</li> </ul>

Box n°3. Description of the management and measures related to confront the epidemics in the Modern World. \*Property elaboration

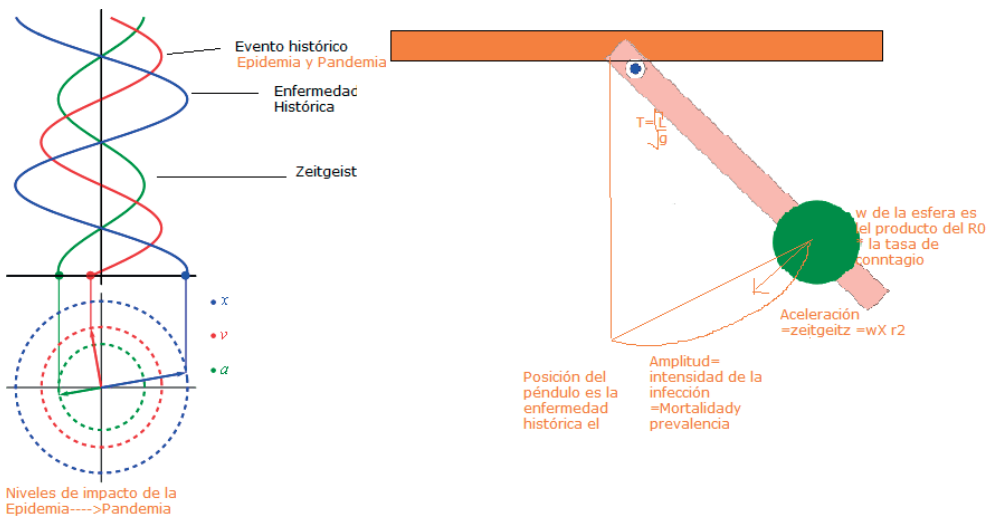


Fig. 7. Pandemic model for futures predictions in the history of humanity. The amplitude of the oscillations in the Armonic Movement System corresponde at de previously inners model for the product of initial prevalence and R0 defined how the minimus ratio to beginnings a pandemia. The semiperiod it's the long duration to preparation a pandemic phenomena, and the another period it's the duration to pandemia, the position of particle correspond the historic time determinanted to the historic disease propousal to Nietzsche and the centrifugal aceleration represents the zetgeist or the spirit of the age while the x representt the incidence or the mortality in the pandemic expressed by the N/t.

The World Trade Organization [WTO], together with the World Health Organization [WHO], posed the following question in the 1970s: What does the population's health status levels depend on? For this, they defined the state of the Population's Health,

through four factors which are the organization of the socioeconomic system, organization of health systems, geographical, environmental and genetics factors<sup>27,28</sup>.

A good example of this can be seen in the measures that Chile-Italy had to take in the face of their epidemics between the 19th and 20th centuries, in order to jump to the development currently proposed by the Western capitalist world. Within the socioeconomic factors, we can find Chile, a feudal-type society that bases its wealth on the exploitation of the countryside and the latifundia, who fought for independence against the Spanish monarchist forces, while in Italy, a state fragmented by the monarchical forces of Austrian and Napoleonic origin, struggled to achieve the dreamed unity. It was the poet, writer and politician Giuseppe Mazzini in 1823, who created fertile ground for Italian independence ideas, which caused a war between the ideas of the Italian Freemason republicans, the carbonari and the Austrian and Napoleonic absolutist monarchists. This caused successive epidemics and epidemic outbreaks that have affected several European nations. Italy was one of the most affected, where cholera was king, especially in the South. While the leader and father of the Chilean nation José Miguel Carrera, together with Bernardo O'Higgins disputed power between themselves and the royalist forces headed by Casimiro Marcot del Pont and representatives of the Royal Court, the first health interventions were carried out with the first vaccinations in national territory in 1811, given the poor hygienic conditions, the sieges and the movement of troops and soldiers that caused epidemic outbreaks and famines in the cities of Santiago and Concepción<sup>6,7</sup>. Both independence processes respond to socioeconomic, political and socio-sanitary phenomena, they are determined by the geographic, environmental and genetic variables of the populations, caused by inequalities and inequities in the distribution of wealth and access to health services, as is the case of the successive outbreaks of cholera in Italy and Malaria in northern Chile, due to the wars of the risorgimento in the case of Italy and the War of the Pacific in the case of Chile, which accentuated overcrowding, and the critical rate of contagion and minimal individuals to start an epidemic, both being swampy areas in the Loa and Lluta Rivers in Chile, while in Italy the Volturno River suffered from the arrival of sewage caused by factories and poorly ventilated and precarious vertical constructions. little neat. All these factors interacted causing successive epidemics in various historical periods and it was not but a bearing of Italian doctor Juan Noé Crevanni together with the teacher of him the Dott. Bautista Grassi who were able to solve both the epidemics that devastated both Chile and Italy during the present centuries<sup>31</sup>.

The WHO health for all year 2000, funded by pharmaceutical companies, stated that all patients should be seen by doctors. The level of health status depends on the socioeconomic organization of health. The accumulation of quantity produces a jump in quality, as in the transformation of ice, into water and then into steam; that is, the generation of a critical mass of health systems, as is the case of Chile and Cuba, between the years

1925 and 1973, which led to an increase in coverage, and a leap in quality, in the when the coverage occurred, given that this transformation process would lead to the creation of the necessary specialists for the generation of referral and counter-referral systems that would cover the health needs of the population. So what are the big lessons we need to learn from the past to deal with the current covid 19 pandemic? The case of Chile had to be adapted by generating educational strategies with the development of telemedicine, online anatomy lessons with live dissections, home delivery of suture packages, and online assisted surgical technique with previously recorded lessons, all based on simulation hi-fi clinic proposed by Finis terrae University<sup>45</sup>.

### Conclusions

It would be advisable to create a world virological center that studies and controls in a coordinated manner, especially in countries with lower per capita income, such as third world countries where there is a greater risk of the appearance of new variants and other viral forms. , in order to isolate and cut the chain of transmission of biological forms, providing sufficient information to be able to predict and take measures before the start of the epidemic and after the pandemic, designating an external epidemiological control committee [archon polemarca] to stop the expansion and spread of the biological agent when it enters the affected country or nation, generating a traceability and isolation strategy that allows the complete closure of cities and urban sectors; In addition to the formation of an epidemiological internal security committee [archon basileo] which has the task of generating favorable conditions to be able to quarantine through the delivery of vouchers and food boxes for 21 days, avoiding generating the critical points necessary for an outbreak, then an epidemic and then a pandemic, receiving information from the regional committees and using it to develop adequate prevention<sup>24</sup>.

Table n° 3. Comparisons between the Epidemics en Italia y de la Malaria en Chile en el siglo XIX y XX

Characteristics of Pandemic	The great cholera epidemic in Naples [1864-1912]	Malary's Epidemy in Arica, Chile. [1888-1952]
<b>Start of the pandemic/ epidemic</b>	In a hot summer at the end of the 19th century, cases of cholera began to be reported in Mediterranean ports. As a medical text says, "The disease, after an incubation period of 1 to 5 days, manifests itself with sudden and intense diarrhea with increasingly liquid and colorless secretions, and therefore with enormous losses of fluids, calcium and potassium. Vomiting follows, aggravating the state of dehydration. The transmission occurs because the vibrio, eliminated with the feces, is not destroyed, due to deficiencies in the wastewater treatment system or water purification, so that it can reach healthy humans through food and drinks.	In Chile, malaria has been restricted since ancient times to the Province of Tarapacá, located in the far north of the country, a region with desert characteristics, a territory that was under the control of the Chilean Government after the Battle of Arica on June 7, 1880. in the context of the Pacific War. In this way, the desert opened up a new field of geographical problems and challenges for Chilean scientists.

Characteristics of Pandemic	The great cholera epidemic in Naples [1864-1912]	Malaria's Epidemic in Arica, Chile. [1888-1952]
<b>Measures taken during the pandemic/ epidemic</b>	The appalling levels of mortality provoke a national debate, which will result, among other things, in the special law for the rehabilitation of Naples, in the relative master plan of the city, and later in the national extension of some measures, considered useful for Intervene in cases of severe urban sanitation conditions, such as the construction of bridges, dams, sewers, sewage collection systems, and houses under horizontal construction.	Committed to the country, Dr. Noé Crevani carried out an anti-malaria campaign, which he himself directed on the ground. The campaign had two main objectives: the extinction of larval anophelesism and the cure of chronic malaria. To achieve the first objective, various measures were adopted that sought to eliminate those areas conducive to the proliferation of the mosquito, river sanitary squads were created, collector channels were built for water from springs or spillage from ditches, among others, in this way with the work carried out considerably decreased anophelesism. On the other hand, to achieve the second objective, health police squads were organized, which were distributed to various localities in the Tarapacá area, where they carried out cures at home and also went to public schools. The campaign achieved full success in 1945, after 32 years of intense work and study. The broad and accurate vision of Dr. Noé was key to the eradication of the country, thus rendering an invaluable service to his adoptive country.
<b>End of the pandemic/ epidemic</b>	A government intervention was designed to definitively solve the old ills of the city. Agostino Depretis, President of the Council, then solemnly declared that it was necessary to "sventrare Napoli" [literally, "to gut Naples"], thus coining the neologism sventramento [inspired by the reading of "Il Ventre di Napoli" by Matilde Serao] which means "demolition" and was applied from that moment to the main urban remodeling operations; <sup>2</sup> and was later extended to all similar urban interventions carried out in Italy in these years.	The campaign achieved full success in 1945, after 32 years of intense work and study. The broad and accurate vision of Dr. Noé was key to the eradication of the country, thus rendering an invaluable service to his adoptive country.
<b>Consequences</b>	It extends to the early 20th century, with the cholera outbreak and epidemic of 1911. When cholera broke out in Naples in 1911, Giuseppe Moscati was commissioned by the civic government to carry out public health inspections and to investigate both the origins of the disease and the best ways to eradicate it. This he did quickly, presenting his suggestions to city officials. Much to his satisfaction, most of these ideas were put into practice at the time of his death.	Sanitary squads were created and the control of endemic malaria in the north of our country made it possible to annex and stabilize the unfinished and poorly controlled socio-sanitary situation by the authorities of the time, being the sanitary hero who achieved and allowed the citizens of the North of Chile settle definitively and become the main producer and extractor of raw materials in the country.

Box 3. Description the measures taken in Chile and Italy against cholera and malaria. \*Property elaboration.

## Bibliography and notes

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