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# CONTROLLING THE GEOGRAPHICAL SPREAD OF INFECTIOUS DISEASE: PLAGUE IN ITALY, 1347–1851

## SUZBIJANJE GEOGRAFSKOGA ŠIRENJA ZARAZE: KUGA U ITALIJI OD 1347. DO 1851.

**Andrew D. Cliff[*], Matthew R. Smallman-Raynor[**], Peta M. Stevens[***]**

**Summary**

*After the establishment of the first quarantine station in the Republic of Ragusa (modern-day Dubrovnik) in 1377, the states and principalities of Italy developed a sophisticated system of defensive quarantine in an attempt to protect themselves from the ravages of plague. Using largely unknown and unseen historical maps, this paper reconstructs the extent and operation of the system used. It is shown that a cordon sanitaire existed around the coast of Italy for several centuries, consisting of three elements: (i) an outer defensive ring of armed sailing boats in the Mediterranean and the Adriatic, (ii) a middle coastal ring of forts and observation towers, and (iii) an inner defensive ring of land-based cavalry. The principles established, although not especially successful at the time against a disease of (then) unknown aetiology, are still used today in attempts to control the spread of infections of animal and human populations.*

***Key words:*** *history of medicine, 14th to 19th century, infectious disease, plague, geographical spread, controlling, Italy*

[*] *Corresponding author:* Professor Andrew D. Cliff, Department of Geography, University of Cambridge, Downing Place, Cambridge, CB2 3EN, UK (adc2@cam.ac.uk)

[**] Professor Matthew Smallman-Raynor, School of Geography, University of Nottingham, University Park, Nottingham, NG7 2RD, UK

[***] Peta M. Stevens, Principal Assistant Registrary, University of Cambridge, Old Schools, Trinity Lane, Cambridge, CB2 1TN, UK.

## 1. INTRODUCTION

After the great pandemic of Black Death which affected Europe for some seven years from 1346, plague became endemic in Europe [1-3]. Italy was entrained in 1347–8, with epidemics continuing there over the next four and a half centuries (Figures 1 and 2). The epidemic history of Italy in this period is reviewed in detail by Corradi [4], while summary overviews of the major outbreaks of plague and plague-like disease are provided by Biraben [5] and Scott and Duncan [6]. To these general surveys can be added many local investigations of plague mortality [7, p. 174], of which the studies of Carmichael [8] and Zanetti [9] on fifteenth and sixteenth century Milan, Morrison, et al [10] and Carmichael [7] on fifteenth century Florence, Ell [11] on seventeenth century Venice and Cipolla [12] on seventeenth century Pistoia are illustrative. As described in these and similar works, the repeated outbreaks of plague deeply affected culture, society and economy at all levels. In response to the threat

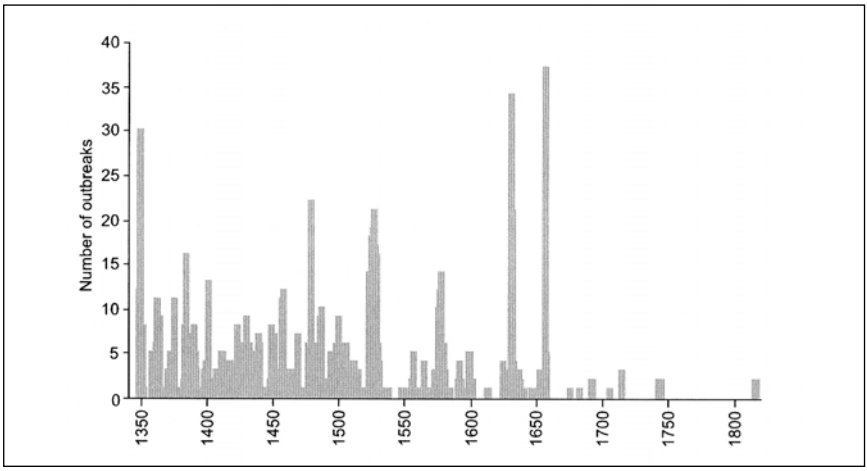



**Figure 1.** Plague outbreaks in Italy, 1347–1816. Annual time series of number of localities reporting plague. The generalized epidemics of 1348, 1383, 1457, 1478, 1522–28, 1577, 1630 and 1656 stand out from the annual background of 4–5 outbreaks which occurred in one place or another throughout the period. *Source*: data in Biraben (1975–76, Annexes III and IV, pp. 363–74, 394–400).

***Slika 1.*** *Kuga u Italiji od 1347. do 1816.: Godišnji izvještaji prema broju i mjestu izbijanja kuge. U odnosu na uobičajeni broj od 4 do 5 epidemija na godinu, tijekom cijelog ovoga razdoblja ističu se opće epidemije iz 1348., 1383., 1457., 1478., 1522.–28., 1577., 1630. i 1656. Izvor: Biraben (1975.–76., Dodaci III. i IV., str. 363.–74., 394.–400.).*

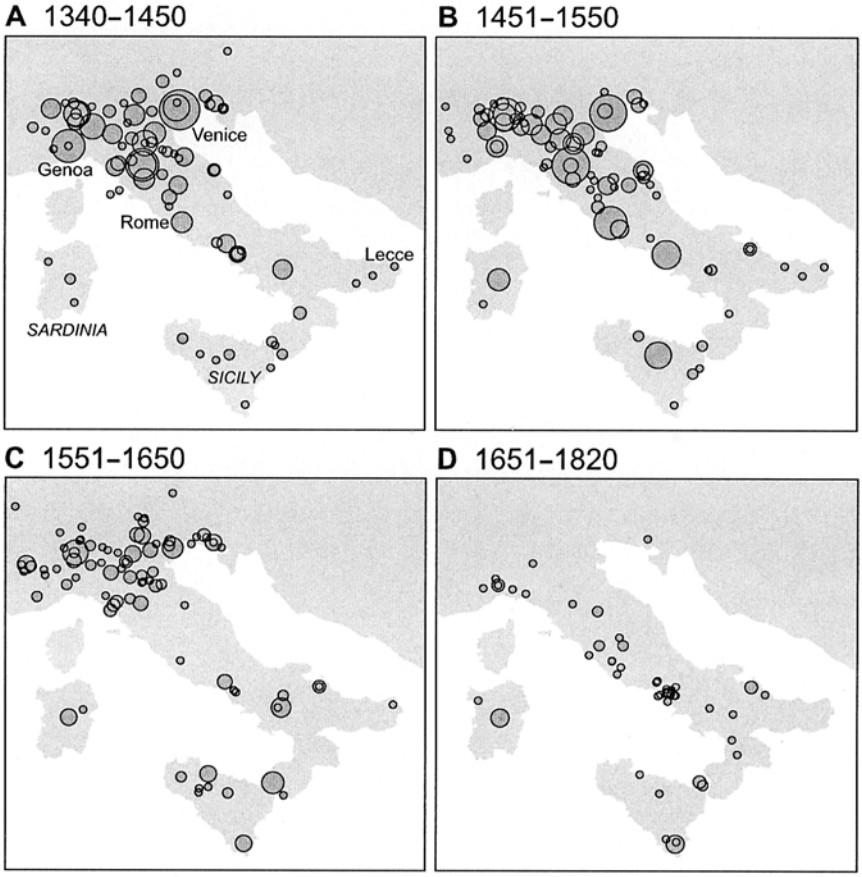



**Figure 2.** Geographical distribution of number of recorded plague outbreaks in Italy, 1340–1820. *Notes*: (A) 1340–1450. (B) 1451–1550. (C) 1551–1650. (D) 1651–1820. Outbreaks declined in number and became more widely dispersed spatially over the period.

*Source*: data in Biraben (1975–76, Annexe IV, pp. 394–400).

***Slika 2.*** *Geografsko širenje kuge i broj epidemija u Italiji od 1340. do 1820. Opis: (A) 1340.–1450. (B) 1451.–1550. (C) 1551.–1650. (D) 1651.–1820. Broj je s vremenom pao, ali su se prostorno epidemije značajno raširile.*

*Izvor: Biraben (1975.–76., Dodatak IV., str. 394.–400.).*

posed by plague visitations, three main groupings of states emerged [6, p. 303]: (i) the city states of the north (particularly Venice, Milan and Genoa), wealthy and jealous of each other; (ii) the Santa Sede (Holy See/ Papal States); and (iii) in the south two very different and poor regions, the Kingdoms of Naples and Sicily (eventually the Kingdom of the Two Sicilies).

It was the northern group of states which led the fight against the disease. Despite its (then) unknown aetiology, these states gradually evolved a system of public health which, by the middle of the seventeenth century, had reached a high degree of sophistication. The northern Italian focus of this evolution was driven by the position of Italy at the interface of Europe and Asia, its location on arms of the Silk Road, and the dependence of the great republics like Venice and Genoa upon trade with Asia for their prosperity, factors which combined to ensure that importation of the plague, especially by ships returning from the Levant, was an ever-present threat. Similar developments to those in northern Italy took place north of the Alps but remained at a much more primitive level – as they did in Italy south of the Dukedom of Tuscany [12, pp. 4–5].

The first rudimentary steps to curb the annual visitations in the eastern Mediterranean area were taken in 1377 when the Republic of Ragusa, a former Venetian colony on the Dalmatian Coast, instituted a legal system for the quarantining of visitors from plague-affected areas [13-16]. The Republic was also the location of the first permanent health office As described in [15] and [17, p. 208], the Ragusean approach was a compromise between the [potentially) complete blockade of human and commercial intercourse generally practised in western Europe in plague periods and the complete absence of intervention in the Ottoman east. The Ragusean system of regulation aimed to protect business in Ragusa, one of the great medieval maritime trading republics in the region.

As regards the Italian states, maritime quarantine was pioneered by the Venetian administration with the establishment of a lazzaretto on the island of Santa Maria di Nazareth in 1403 [2,18,19]. The system which evolved from this root over the next two centuries was based upon special Magistracies which, while they combined legislative, judicial and executive powers in all matters pertaining to the public health, had as their prime focus prevention of the plague. By the middle of the sixteenth century, all major cities of northern Italy had permanent Magistracies, reinforced in times of emergency by health boards set up in minor towns and rural areas. All boards were subordinate to and directly answerable to the

central Health Magistracies of their respective capital cities [12, p. 4]. The Magistracies stressed prevention rather than cure, and out of their organizational genius came the ideas of quarantine that have persisted to the present day.

The nature and operation of Italian plague defences has attracted a specialised literature [see 7, p. 175]. In the English language, the several volumes by Cipolla [12,20,21] are well known, while Italian-language studies and reports in relation to such cities as Florence [22], Milan [23-25] and Venice [26, 27] are illustrative of local investigations. Recent studies by Konstantinidou, et al. [28] and historic reports by Magistrato della Sanità, Venice [29] and Howard [30] add further context for the discussion to follow.

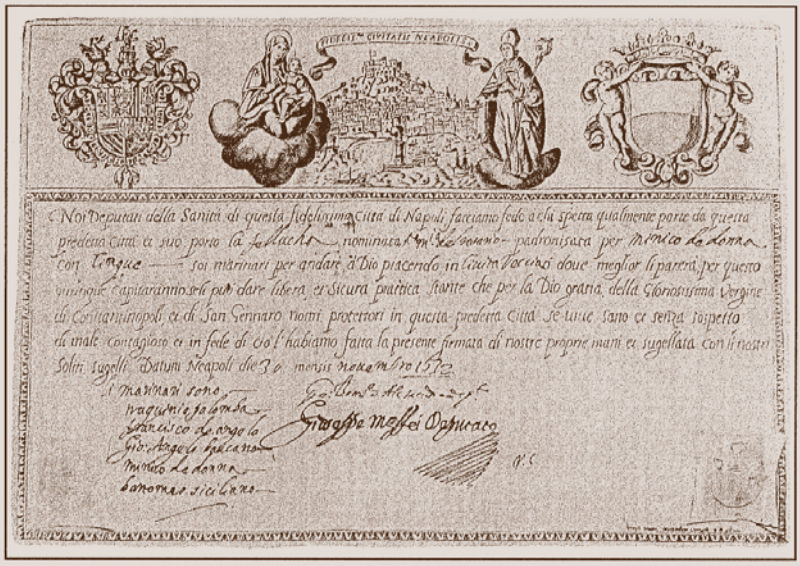
The Italian system of plague defence had two main elements:

1. *Communication*. The northern Italian cities kept each other informed of the believed state of health of other locations in the region.

In the course of the sixteenth and seventeenth centuries the Health Magistracies of the capital cities of the republics and principalities of Italy north of the Santa Sede had established the eminently civilized custom of regularly informing each other of all news they gathered on health conditions prevailing in various parts of Italy, the rest of Europe, North Africa, and the Middle East. For example, Florence 'corresponded' regularly with Genoa, Venice, Verona, Milan, Mantua, Parma, Modena, Ferrara, Bologna, Ancona, and Lucca. The frequency of the correspondence with each of these places ranged from one letter every two weeks in periods of calm to several letters a week in times of emergency [12, p. 21].

Spies and later official observers were also present in the major cities who reported back to their employers on the state of health in the various republics and principalities. But it was the great plague epidemic of 1652 which ultimately led to agreed, co-ordinated and enforced action among the north Italian states in a *Capitolazione* (Convention) between Florence, Genoa and the Santa Sede (Holy See). The Convention bound the three powers to common practices and health measures in the principal ports of Genoa, Leghorn (Livorno) and Civitavecchia. Each state agreed to allow the other two to station one representative of their respective health boards in the main harbour – a forerunner of "international controls and the voluntary relinquishment of discretionary powers by fully sovereign states in the matter of public health" [12, p. 34]. The *concerto* between Tuscany and Genoa came rapidly to pass, but attempts to bring in the state

A



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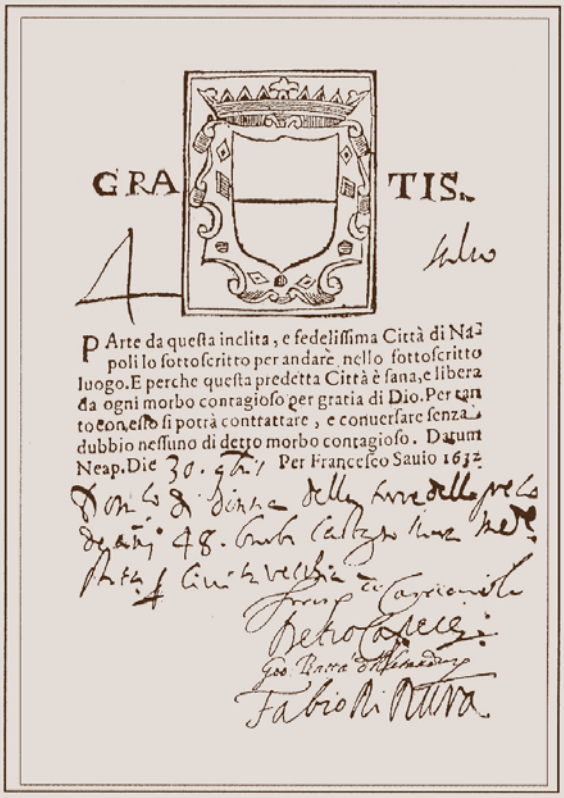

GRATIS.
PArte da questa inclita, e fedelissima Città di Napoli lo sottoscritto per andare nello sottoscritto luogo. E perche questa predetta Città è sana, e libera da ogni morbo contagioso per gratia di Dio. Per tanto con esso si potrà contrattare, e conuersare senza dubbio nessuno di detto morbo contagioso. Datum Neap. Die 30. 9bris Per Francesco Sauio 1637.

**Figure 3.** Certificates issued by the City of Naples in 1632. *(Upper)* This document, which measures 35 × 25 cm, is embossed with coats of arms and a panorama of Naples. It was issued to the captain of the fellucha (a type of boat) named *Santa Maria del Rosario*, which was sailing from Naples to Civitavecchia, the port of Rome, with five sailors on board whose names are listed at the end of the certificate. It declares Naples to be free of all infectious disease, and asks for unrestricted and secure *pratique* (*prattica*: a licence to deal with a port after quarantine or on producing a clean bill of health). *(Lower)* This certificate, measuring 16 × 12 cm and embossed with the arms of the city of Naples, was given in plague periods to each traveller from the port of Naples at embarkation. It declares the city to be healthy and free of all morbid contagions. It also declares that it is safe to trade and negotiate with the bearer without fear of infection. The almost illegible handwriting gives the date (30 June or July), the name and a description of the bearer, his destination, as well as the signatures of the four representatives of the city authorities. The anonymous source author (p. 32), interprets the script as Giovanni Angelo Baucano, of the Greek Tower (*de la Torre dello Greco* barely recognizable at the end of line 1), age 48 (de anni 48, line 2), with a dark chestnut moustache (*castagno*, middle of line 2) and a mole on the upper left cheek, travelling to Civitavecchia (line 3). The signatories are: Francesco Caracciolo, Delio Capece, Giov. Battista d'Alessandro, and Fabio di Ruvo. Such certificates were issued to try to guarantee free passage and continuance of travel in the face of bans and suspensions.

*Source:* Ministero dell'Interno, Direzione Generale Della Sanità Pubblica, Napoli (1910, Plates II and III following p. 32).

***Slika 3.*** *Potvrde Grada Napulja iz 1632. (gore) Ovaj dokument dimenzije 35 × 25 cm ukrašen je grbom s vizurom Napulja. Potvrda je izdana kapetanu feluke (izv. fellucha, tip jedrilice) imena Santa Maria del Rosario, koja je plovila iz Napulja u rimsku luku Civitavecchiju, a posada se sastojala od pet mornara navedenih na dnu potvrde. Potvrdom se izjavljuje da u Napulju nema zaraznih bolesti te se njome traži neograničena dozvola (izv. prattica) za lučko poslovanje nakon propisane karantene, odnosno predočenja potvrde o zdravlju posade. (dolje) Ova potvrda dimenzija 16 × 12 cm ukrašena grbom Grada Napulja izdavala se u napuljskoj luci za vrijeme kuge svim putnicima pri ukrcaju. Njome se izjavljuje da je grad zdrav te da u njemu nema zaraza. Također se izjavljuje da se s nositeljem potvrde može trgovati i pregovarati bez straha od zaraze. Iz gotovo nečitkoga rukopisa razaznaje se datum (30. lipnja ili srpnja), ime i opis nositelja potvrde, kamo se uputio te potpisi četvorice predstavnika gradskih vlasti. Anonimni autor (p. 32) tumači da na rukopisu piše Giovanni Angelo Baucano de la Torre dello Greco (pred kraj prvoga reda jedva se da razaznati), starost 48 godina (de anni 48, 2. red), tamnosmeđih brkova (castagno, sredina 2. reda) s madežom na gornjem dijelu lijevoga obraza, putuje u Civitavecchiju (3. red). Potpisnici su: Francesco Caracciolo, Delio Capece, Giov. Battista d'Alessandro i Fabio di Ruvo. Ovakve su se potvrde izdavale s nadom da će ishoditi slobodan prolaz i nastavak putovanja usprkos privremenim zabranama.*

Izvor: *Ministarstvo unutarnjih poslova, Opća uprava za javno zdravstvo, Napulj (1910., table II. i III. nakon str. 32.).*

groupings (ii) and (iii) above (the Santa Sede and Naples) proved meagre. Even the *concerto* between Tuscany and Genoa collapsed a few years later, but it was a remarkable early attempt at international health collaboration not repeated for 200 years until the international control of the great nineteenth-century cholera pandemics became paramount.

2. *Defensive isolation.* When contagious disease was uncovered anywhere by a particular Magistracy, a proclamation of ban (when the presence of communicable disease was positively ascertained) or suspension (precaution because there was legitimate suspicion of disease) was issued. Bans were long-term, suspensions short-term. Bans and suspensions were used to denote the interruption of regular trade and communication. With banishment and suspension, no person, boat, merchandise or letter could enter the state issuing the order except at a few well-specified ports or places of entrance where quarantine stations were set up. At the stations, incoming people, boats and merchandise were subject to quarantine and disinfection even if they carried health certificates issued at the point of departure (Figure 3). The authorities also reserved the right to refuse access to anything or anybody from banished areas – even, if necessary, to the quarantine stations. People attempting to violate the ban or enter the territory of the banishing state were executed (Figure 4).

To enforce bans and suspensions, the republics and principalities established along the Mediterranean and Adriatic coasts, as well as along land borders with other countries, a complex *cordon sanitaire* of forts, towers and observation posts, organized by the military (coastal guards), to prevent both the landing of boats other than at authorised quarantine stations, and overland travel and intercourse. Such was the importance of the system that maps were produced to show the location and manning of the sanitary observation and guard posts which comprised the *cordon*. Some of these maps, along with the associated records of manning and the day books of travellers through the posts, have survived in a number of Italian state archives. The primary purpose of this paper is to draw attention to the existence of these little-known and largely unpublished maps. A secondary purpose is, insofar as the maps allow, to reconstruct the defensive quarantine system which ultimately evolved. This second task is complicated by a number of factors:

(i) In general the maps are not listed in public catalogues and have been located by field visits to the principal state archives. Other maps must surely exist that we have not yet discovered.

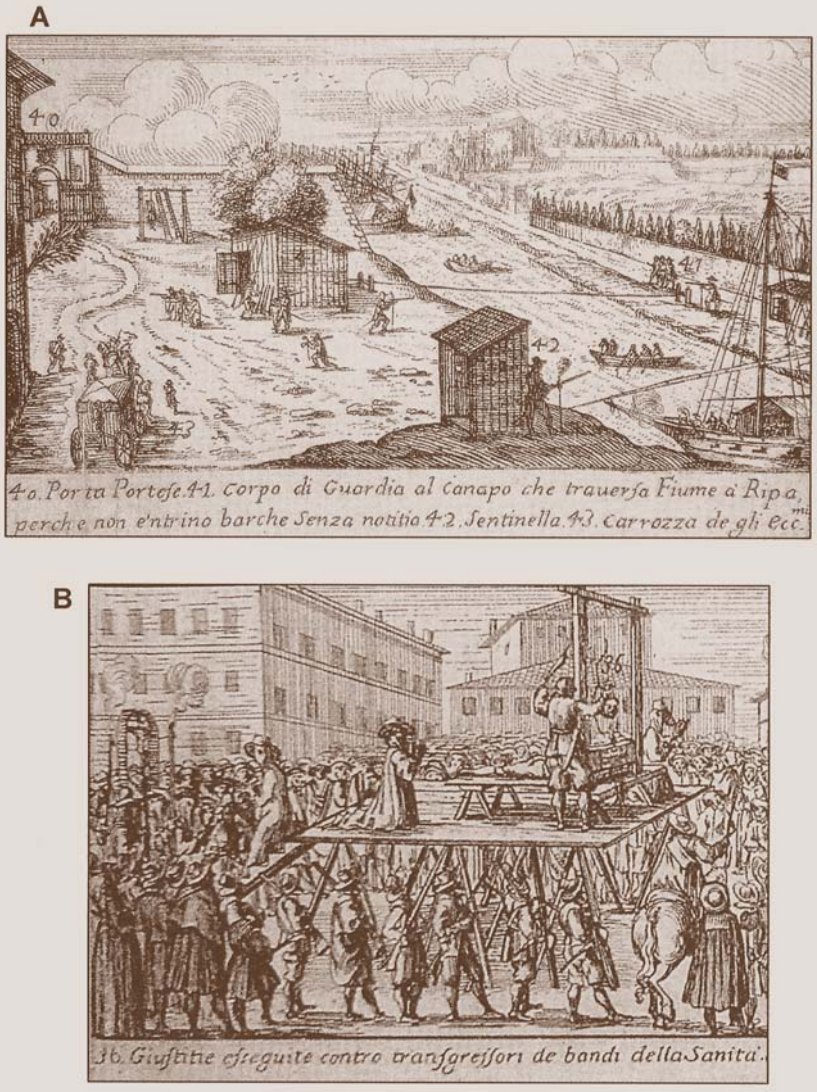



**Figure 4.** The plague in Rome, 1656. Extracts from G.G. de Rossi's 1657 three-part etching of episodes of the 1656 outbreak of the plague in Rome. *(Upper)* Guarded river crossing point (41) to ensure boats did not land illegally with a sentry (42) at his post; *(Lower)* (36) Execution of persons who broke the quarantine rules. *Source*: World Health Organization Library, Geneva.

***Slika 4.*** *Kuga u Rimu 1656. Scene iz trodijelnoga bakroreza koji prikazuje događaje vezane uz epidemiju kuge u Rimu iz 1656. (gore) Prijelaz (41) rijeke pod stražom (42) kako plovila ne bi potajice mogla pristajati; (dolje) (36) Smaknuće prekršitelja karantene.* Izvor: *Knjižnica Svjetske zdravstvene organizacije u Ženevi.*

(ii) Most of the maps located are from the seventeenth century onwards (1699 is the earliest). This may reflect both non-survival/non-production of maps from earlier centuries and/or our failure to find them.

The patchwork quilt of maps we have compiled inevitably constrains our ability to establish the speed with which the system evolved from what must have been primitive beginnings to the full flowering shown on many of the map extracts reproduced later in this paper. However, large and small facsimile copies of fifteenth and sixteenth century coastal maps (eg in 31) show many of the coastal stone observation forts which were ultimately incorporated into the *cordon sanitaire*. This implies that some of the main elements of the *cordon* were rapidly put in place once plague became endemic in Italy, and that a high degree of sophistication existed by the middle of the seventeenth century.

The time window we have selected in this paper dates from the establishment of endemic plague in Italy to the conclusion of the plague centuries. We have taken as a convenient end point 1851; 1851 is after the date of the latest map we have traced (1843), and 1851 marks the shift in global health concerns from plague to cholera witnessed at the first International Sanitary Conference in Paris [32].

Subject to these caveats, the paper shows that the quarantine principles established by the middle of the seventeenth century probably changed little thereafter. The *cordon sanitaire* approach to controlling the geographical spread of plague which was developed in Italy is still used today to control the spread of epizootics and to mitigate the impact of both newly emerging and re-emerging infectious diseases upon the human population. We consider first the general picture which emerges before examining in turn maps and prints for (i) two of the northern states (the Republics of Venice and Genoa), (ii) the Santa Sede, and finally (iii) the Two Sicilies.

## 2. Disease control in Italy, 1347–1850

### 2.1 Italy

Figure 5 shows the geographical distribution of maps so far traced which plot the guard/observation posts comprising the *cordon sanitaire*. The strings of posts are denoted by the solid lines. The identity numbers correspond with the numbered list of sources given in the paper appendix.

The lines of posts ran round the entire sea coast of Italy, as well as down the Dalmatian coast. As we shall see from the examples which fol-

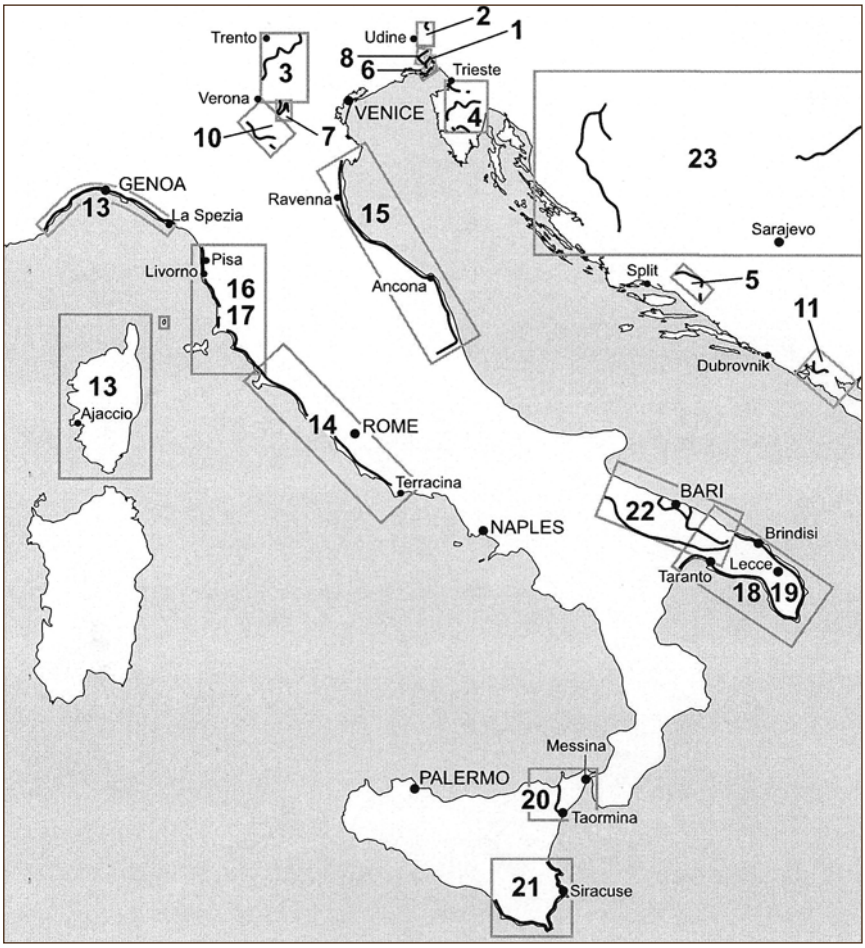



**Figure 5.** Defensive containment and the plague in Italy in the eighteenth century. Geographical locations of maps showing observation posts which comprised the defensive isolation ring maintained around Italy against the plague. Map extents are shown by boxes, and strings of posts by heavy lines. The identity numbers correspond with the sources listed in Appendix 1.

***Slika 5.*** *Kuga i obrana protiv nje u Italiji u XVIII. stoljeću. Položaji na geografskoj karti su promatračnice koje su sačinjavale izolacijski pojas obrane od kuge oko cijele Italije. Područja pokrivena kartama predočena su s pomoću kvadrata, a nizovi promatračnica debelim crtama. Brojevi su povezani s popisom u Dodatku 1.*

low, the defensive system consisted of two elements: (i) in both the Adriatic and the Mediterranean, armed sailing boats (*feluccas*, *trabaccoli*, *baragozzi*) to stop illegal landings; and (ii) coastal observation towers and sentry boxes manned by armed infantry who stopped and recorded people and merchandise passing through the post. In addition, so-called "flying corps" of cavalry were deployed in some locations in the rear of the observation posts. The role of the flying corps was to act as a rapid response force, mopping up sources of infection which penetrated the outer rings of boats and observation posts. Finally, within the overall ring, individual defensive quarantine rings were constructed from time to time along land borders and around individual towns as necessary to respond to local disease threats.

The observation posts were constructed within sighting distance of each other; communication between posts was primarily by sephamore (daylight) and beacon (night) signals. The reporting system was hierarchical: *local observation posts* ⇒ *district central command post* ⇒ *regional reporting centre*. Some of the maps give an indication of the manning – around 2–5 soldiers per observation post, with periodic forts of around 30–50 men. Observation posts not only recorded the traffic passing, but also tried to prevent illegal passage so that ships, goods and travellers were routed into fixed quarantine stations.

## 2.2 The Northern States

### Venice

Because of its maritime supremacy and trading connections, the Venetian Republic was visited by plague at regular intervals over nearly five centuries. Accordingly, the Republic established an extensive ring of sanitary guard posts around its borders from an early date. Figure 6 illustrates an extract from one of the surviving maps around Monfalcone. The individual guard posts appear as tents (see added enlarged inset in bottom left corner), while the 76 posts (*cass(t)elli*) are named in the entablature. Figure 7 illustrates the frontier ring erected along the borders of the territory of Friuli in 1713 at times of epidemics. This print shows the guard posts for the infantry (*appostamenti di infanteria*) in the foreground, as well as men in arms and supporting cavalry.

The guard posts were designed primarily to prevent the arrival of plague overland. The Ottoman Dominions were regarded as the main threat. On arrival, persons and goods suspected of carrying disease were confined in one of the city's two *lazarettos* for a statutory quarantine period of 40 days.

**Figure 6.** Map of the territory of Monfalcone between the lake of Pietra Rossa and the River Isonzo, showing the towns, posts and sanitary guard huts at the border with the Granducale (Tuscany).

*Source*: Appendix 1 (8).

***Slika 6.*** *Karta područja Monfalconea između jezera Pietra Rossa i rijeke Soče, na kojoj se vide gradovi, postaje i kućice sanitarne straže na granici s toskanskim Granducaleom.*

Izvor: *Dodatak 1 (8)*.

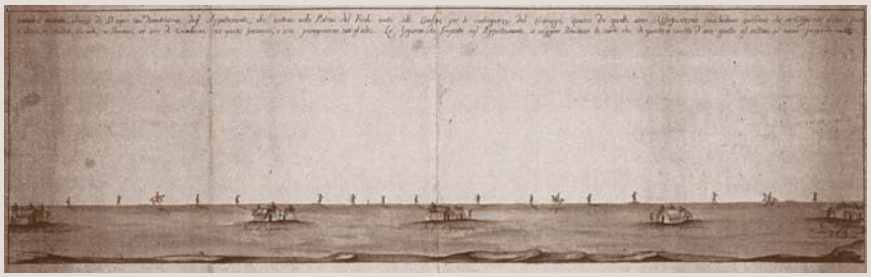


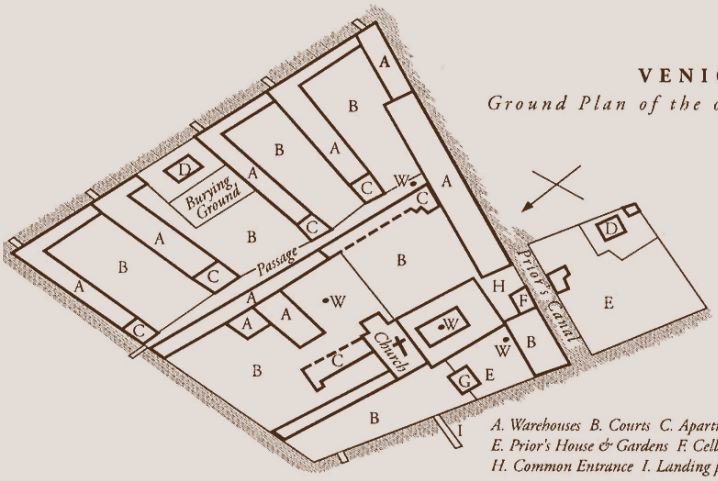
**Figure 7.** Acquatint drawing of the infantry and cavalry posts erected along the borders of the territory of Friuli in times of epidemics.

*Source*: Appendix 1 (9).

***Slika 7.*** *Postaje pješaštva i konjice postavljene duž granice pokrajine Friuli u vrijeme epidemija, akvatinta.*

Izvor: *Dodatak 1 (9)*.

*Isle du vieux Lazaret.* *Isola del Lazzaretto vecchio.*




**VENICE**

*Ground Plan of the old* ***LAZARETTO***

*A. Warehouses B. Courts C. Apartments D. Powder Magazines*
*E. Prior's House & Gardens F. Cellar for War G. Parlour*
*H. Common Entrance I. Landing places W. Wells*

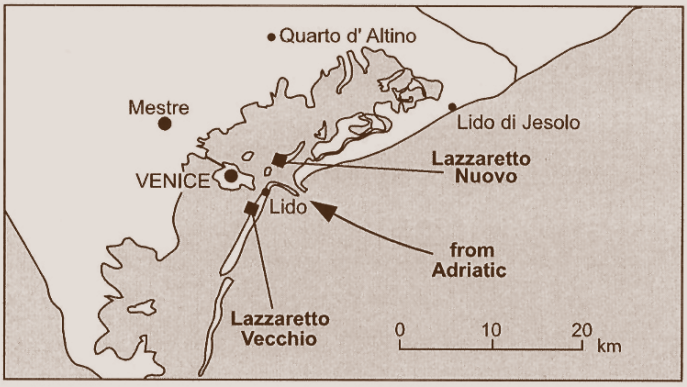


**Figure 8.** Lazarettos of Venice. Location map of the Old (*Lazzaretto Vecchio*) and New (*Lazzaretto Nuovo*) Lazarettos of Venice. The engravings show the ground floor plan of *Lazzaretto Vecchio* and a prospect of the lazaretto from the northwest corner. *Lazzaretto Vecchio* was established in 1423 about 2 km from Venice on a small island then known as Santa Maria di Nazareth, close to modern Lido. It is generally regarded as the world's first fully-functioning quarantine station. *Lazzaretto Nuovo* was established in 1468 on the island then known as Vigna Murada, separated by a navigable channel from the southern tip of the island of Sant' Erasmo, about 3 km from Venice. It occupied a strategic location at the entrance to the Venetian lagoon from the Adriatic and, when visited by John Howard in 1786, was used primarily to quarantine Turks, soldiers and crews of plague-infected ships (Howard, 1791, p. 11). By decree, ships, passengers and goods were isolated for a limited period to allow for the manifestation of any disease and to dissipate imported infection. Originally the period was 30 days, *trentina,* but this was later extended to 40 days, *quarantina.* The choice of this period is said to be based on the period that Christ and Moses spent in isolation in the desert. The Venetian system became the model for other European countries and the basis for widespread quarantine control for several centuries.

*Source*: Ground floor plan of *Lazzaretto Vecchio* from Howard (1791, Plate 12); prospect is a mid eighteenth-century copper engraving by the Venetian artist, Giuseppe Filosi. The ground floor plan has been distorted to conform with the prospect.

***Slika 8.*** *Venecijanski lazareti. Topografska karta Staroga (Lazzaretto Vecchio) i novoga (Lazzaretto Nuovo) lazareta. Bakrorezi prikazuju tlocrt prizemlja Staroga lazareta i pogled iz sjeverozapadnoga kuta. Stari je lazaret uspostavljen 1423. i nalazio se na otočiću koji se tada zvao Santa Maria di Nazareth, oko 2 km od Venecije, a blizu današnjega Lida. Opće je priznat kao prva potpuno funkcionalna karantena u svijetu. Novi je lazaret uspostavljen 1468. na otoku koji se tada zvao Vigna Murada, oko 3 km od Venecije, a nasuprot južnoga rta otoka Sant' Erasmo od kojega je razdvojen plovnim kanalom. Nalazio se na strateškome mjestu na ulazu u venecijansku lagunu s Jadrana. U doba kada ga je posjetio John Howard 1786. bio je ponajprije namijenjen za smještaj Turaka, vojnika i posade kugom zaraženih brodova (Howard, 1791., str. 11.). Brodovi, putnici i roba ukazom bi se izolirali na vrijeme potrebno da se pokažu znakovi bolesti i smanji zaraza izvana. U početku je razdoblje izolacije bilo 30 dana, tzv.* trentina*, ali se poslije produljilo na 40 dana, tj.* quarantinu*. Govori se da se takvo trajanje temelji na razdoblju koje su Krist i Mojsije proveli u izolaciji u pustinji. Venecijanski je sustav postao predložak za druge europske zemlje i temelj sveopćega karantenskoga suzbijanja širenja bolesti u idućim stoljećima.*

Izvor*: Tlocrt prizemlja Staroga lazareta (Lazzaretto Vecchio) iz Howardove knjige (1791., tabla 12.); prikaz iz kuta je bakrorez iz sredine XVIII. stoljeća venecijanskoga umjetnika Giuseppea Filosija. Tlocrt prizemlja je iskrivljen da odgovara prikazu.*

Trying to prevent plague arriving by sea was especially complex and is described in a mid-eighteenth century booklet by Venice's *Magistrato della sanità* [29].

"Experience has shewn (sic), that in the *Ottoman* Dominions, the Plague is never utterly extinct: Hence it is an immutable Law with the Magistrate of the Office of Health, to consider the whole Extent of the *Ottoman* Dominions and every State dependent on it, as always to be suspected to be in an infected Condition, to such a Degree, as not to receive, in any Part of the Dominions of the Republick (Venice), either confining to or commercing with them, any Persons, Merchandizes, Animals, or any other Thing coming from thence, without the necessary Inspection of the Office of Health, and the previous purifications" [29, p. 4].

Although the Ottoman Dominions were perceived as the prime risk, the same procedures were followed for "every Vessel, coming from any Part of the World, that is either infected, or suspected to be so" [29, p. 4]. Vessels were normally expected to stop at Istria to take on board a pilot, or were towed up to Venice. Spies were maintained on the high tower of San Marco to watch for approaching vessels. The Magistrate sent one of his 60 Guardians to meet the ship which was moored in distant canals up to 25 km from the city according to the level of perceived risk. Ships were guarded throughout the quarantine period. They were unloaded of goods and passengers and both were dispatched to one of the city's two *lazarettos*. Generally, unless they were afflicted with full-blown plague, new arrivals were confined in the *Nuovo Lazzaretto* (New Lazaretto). The unfortunate creatures suffering from full plague either on arrival or during quarantine were dispatched to *Lazzaretto Vecchio* (the Old Lazaretto); see Figure 8 for locations and descriptions. Only when the ship had been fully unloaded did the statutory 40 day quarantine period begin.

The Old and New Lazarettos were isolation hospitals on islands. The Old was 525 feet by 425 feet, the New 560 feet by 460 feet. Each was capable of holding 6,730 bales of merchandise. The Old could properly house about 300 passengers, the New 200 [17, pp. 183-210; 29]. The *lazarettos* were not only externally isolated but constructed to provide internal isolation of goods and passengers to the individual level. Conditions were frequently appalling. It was not uncommon for people to die at the rate of 500 per day in *Lazzaretto Vecchio* during plague outbreaks in the sixteenth century, while *Lazzaretto Nuovo* was recorded as holding 8,000 inmates on one occasion, far beyond the capacities of either lazaretto to do anything worthwhile [17, p. 195 for example].

The captain of the vessel was taken ashore by a guarded way to a point of examination. The examination turned upon whence the vessel had come, duration of the journey, places visited and their health, visits ashore, contact with other vessels at sea, the health of the ship's crew and passengers, and the nature of the cargo. Account had to be rendered of any crew or passengers who had died on board or who had left the ship *en route* "and particularly the Condition of that Person who is wanting" [29, p. 8]. If the examining officer was satisfied "if the Vessel really come from a place that is free, it (the vessel) is declared free; if from a suspected one (place), the ship was place in quarantine."

The principles of quarantine for goods were frequent handling, airing, and smoke fumigation with aromatic herbs. Cloth and untreated animal hides were regarded as especially risky. Although the procedure varied in detail by product, bales were generally opened, aired, rummaged and cleaned up to twice a day, and moved from one location to another once a week. For people, social interaction was prevented, and each individual had his/her own cell, garden plot and cooking facilities. Individuals who died in quarantine were checked for plague marks before being buried in lime in holes at least 12 feet deep. In the event that any disease broke out during a quarantine period, the process was repeated so that second and third quarantines were not unheard of for individual ships.

The Venetian example is important for illustrating certain repeating features of quarantine systems down the ages, namely: isolation of suspected goods/animals and travellers from the populous for a period long enough to reduce the risk of transmission of infection to the public at large; the idea of a ring system of health check posts around an area; isolation hospitals in which suspected individuals and chattels were housed until cleared; and identification of parts of the world where infection was likely to be found.

## Genoa

The defensive quarantine ring, as well as the location of other infrastructure used to protect the public health of the Republic of Genoa, was mapped in a remarkable atlas by Matteo Vinzoni in 1758 [paper appendix 1, source 13]. In the first half of the eighteenth century, Liguria was divided into 36 health districts, each overseen by a Commissioner for Health. Using one plate per district, Vinzoni charted the locations of the hospitals, lazarettos and sanitary (health) observation posts serving each district. The manning information recorded by Vinzoni varied by health

district and is of three types: (i) the complement by day and night at each of the guard posts; (ii) post complement plus information on the military support in the district; (iii) simple lists of the post names.

Archival documents indicate how the system operated. Regular armed soldiers were assigned to the posts, supported by men from the local area on a rotation basis. Some posts were manned day and night while others were manned only at night. Noctural manning was more intensive because inter-post communication and observation was restricted by darkness. Logs were kept at each post of the visitors passing through the post.

Figure 9 illustrates the map for the health district of San Pier d'Arena which comprised the subdistricts of Cornigliano and Sampierdarena (sic). The plate shows that 10 smaller observation posts (*guardia*) were supported by a castle (*castello*) [site 9]. Some of the accompanying text details the night patrols. The two for San Pier have been added to Figure 9. The guard posts of the two subdistricts were visited by three patrols nightly. Each patrol consisted of two men from the castle who had been collected by a patrol leader from each subdistrict. The first patrol ran between 0100–0500 hours, the second between 0500–0900 hours and the third from 0900–1300 hours. At the conclusion of each patrol, the guard was returned to the castle by the patrol leader. This intensity was judged sufficient for the number of visitors to San Pier (90 per day).[1]

[1] *Le distanze delle Ville, e luoghi da questi Posti di San Pier d'Arena, e Cornigliano sono notati in fine della presente descrizione. Tutti li detti Posti, e guardie avanzate, tanto di San Pier d'Arena, quanto di Cornigliano vengono visitati di notte da tre Ronde di due Uomini per ciascheduna, l'una sucessivaménte all' altra, cio e quei di San Pier d'Arena dalle tre Ronde loro destinate, e quei di Cornigliano da alter tre a cio destinate. Le dette Ronde tanto di San Pier d'Arena, che di Cornigliano anno obligo di girare di prima, cio e da un ora sino alle cinque, la seconda dalle cinque sino alle novo, la terza dalle nove sino alle tredici. Le dette Ronde sono composte, cio e quelle di San Pier d'Arena d'un Uomo di San Pier d'Arena, che all 'ora destinatale si fa dare una guardia dal Posto del Castello, e con essa di compagnia fa sua visita rimandando la guardia al suo Posto terminata la Visita, e cose succedendo altro per la seconda, ed altro per la terza, pigliando anch' essi una guardia al detto Posto. Quelle di Cornigliano d'un Uomo di Cornigliano, che all 'ora destinatale piglia una guardia al posto di mezzo di Cornigliano, e fa il suo giro, rimanendo la guardia al suo Posto terminato detto giro, il simile il Visitator di seconda, e quello di terza, pigliando anch' essi a suo tempo una guardia al detto Posto. Li Visitatori di San Pier d'Arena sono in n° di 90, e a' tre per note supliscono per giorni n° 30, e cosi anno di respiro un mese a' ricominciare il loro giro*. Source: Appendix 1 [13, p. 12].

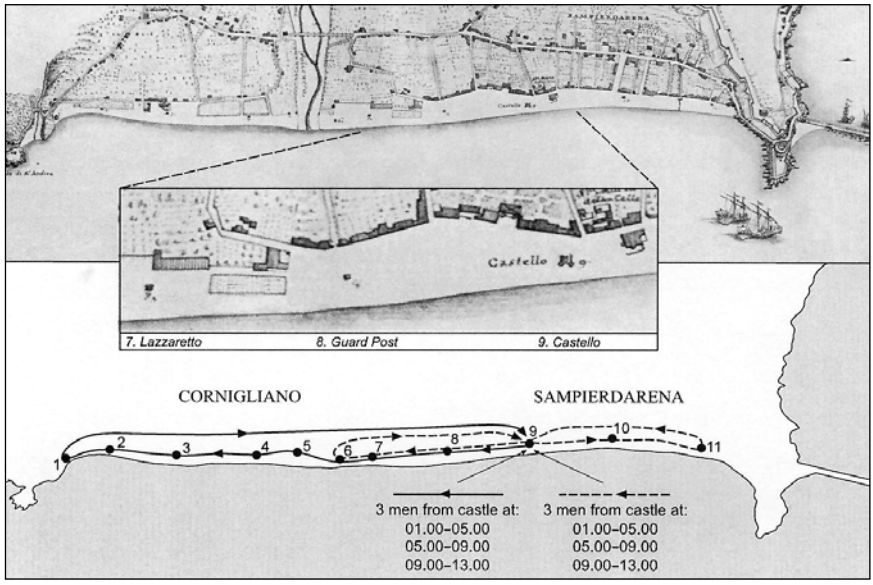



**Figure 9.** Sanitary guard posts of Genoa. Extract from the map of the health district of San Pier d'Arena from Vinzoni's sanitary atlas of Genoa (1758) showing the guard posts (*guardia*) along the coast, along with the routes followed by the night patrols (added). The enlargement shows that Vinzoni numbered the posts serially on his maps, and this was linked to an account of the manning and nature of each guard post in his Atlas. See text for examples. *Source*: Appendix 1 (13, pp. 8–9).

***Slika 9.*** *Sanitarne stražarnice grada Genove. Izvadak iz karte zdravstvenoga područja San Pier d'Arena iz Vinzonijeva sanitarnoga atlasa Genove (1758.) na kojem se vide stražarnice (izv.* guardie*) duž obale te rute kojom su prolazile noćne patrole (dodano). Na uvećanju se vidi da je Vinzoni na kartama numerirao stražarnice u nizu i brojeve povezao s opisom broja ljudi i naravi svake stražarnice u atlasu. Vidi tekst za primjere.* Izvor: *Dodatak 1 (13, str. 8.–9.).*

## 2.3 The Santa Sede (Holy See/Papal States)

Two maps exist showing the *cordon sanitaire* for the Santa Sede, one for the Mediterranean coast, and one for the Adriatic coast including the land border with the Kingdom of Naples. We discuss each in turn.

### *Mediterranean coast* [appendix source 14]

This map plots and tabulates the military, sanitary and customs posts along the 226 km Mediterranean coast of the Santa Sede from the border with the Grand Duchy of Tuscany to Graticciare on the border with the Kingdom of Naples. Operationally, the coast was divided into four Divisions,

Civitavecchia (12 observation posts), Fiumicino (5 posts), Porto d'Anzio (7 posts) and Terracina (10 posts), at average spacing of 6.6 km.

### Adriatic coast, Ravenna to Ascoli [appendix source 15]

The map of this 80 km section of coast was divided into four geographical Divisions, each under the command of an army captain and his adjutant. The extract in Figure 10 shows the First Division from Ancona to Ascoli, and the Fourth Division (the land border with the Kingdom of Naples). The Divisions were divided into Sections (for example, 10 in the case of the First Division). Within each Section, observation or lookout posts were established at regular intervals, approximately 0.33 km apart. Nearly all Sections had their own sanitary officer (marked with an asterisk). There was a reporting hierarchy; Section lookout posts reported to a central lookout post occupied by the Commander of the Section and the Sanitary Superintendent. In their turn, the central lookout posts returned their data to Divisional reporting lookout posts which were responsible for transmitting the information to the Commander-in-Chief of the *cordon sanitaire* (Captain Guiseppe Vaselli), whose seal appears in the lower right corner of Figure 10.

As Figure 10 shows, the map plots the location of each lookout post; these are serially numbered 1, 2, ..., *n* within each Division. Also given is the military complement of each post (italic script on the seaward side of each bar). In addition to the infantry, flying corps (cavalry; cf. Figure 7 for Venice) were based in Ascoli to support the lookout posts in maintaining the *cordon* along the land border with the Kingdom of Naples. The flying corps operated an offensive containment policy. The map includes a summary table of the manning of the *cordon* – for the four Divisions, nearly 1,900 men. Armed sailing boats (*trabaccoli*) cruised the Adriatic and completed the protection ring (one appears in Figure 10). The area around Ravenna (Section 5 of the Third Division) must have been especially vulnerable, adjacent as it was to the great trading city of Venice, and with many inland rivers. Here the quarantine defences were reinforced by squadrons of 4–6 small sailing boats (*baragozzi*). Thus consistent with the system around Venice, the quarantine ring was three layers deep; an outer ring of armed boats in the Adriatic, a middle ring of coastal observation posts manned by infantry, and an inner ring of what in modern terms would be called a rapid response force of cavalry providing additional offensive cover – here at the land frontier with the Kingdom of Naples.

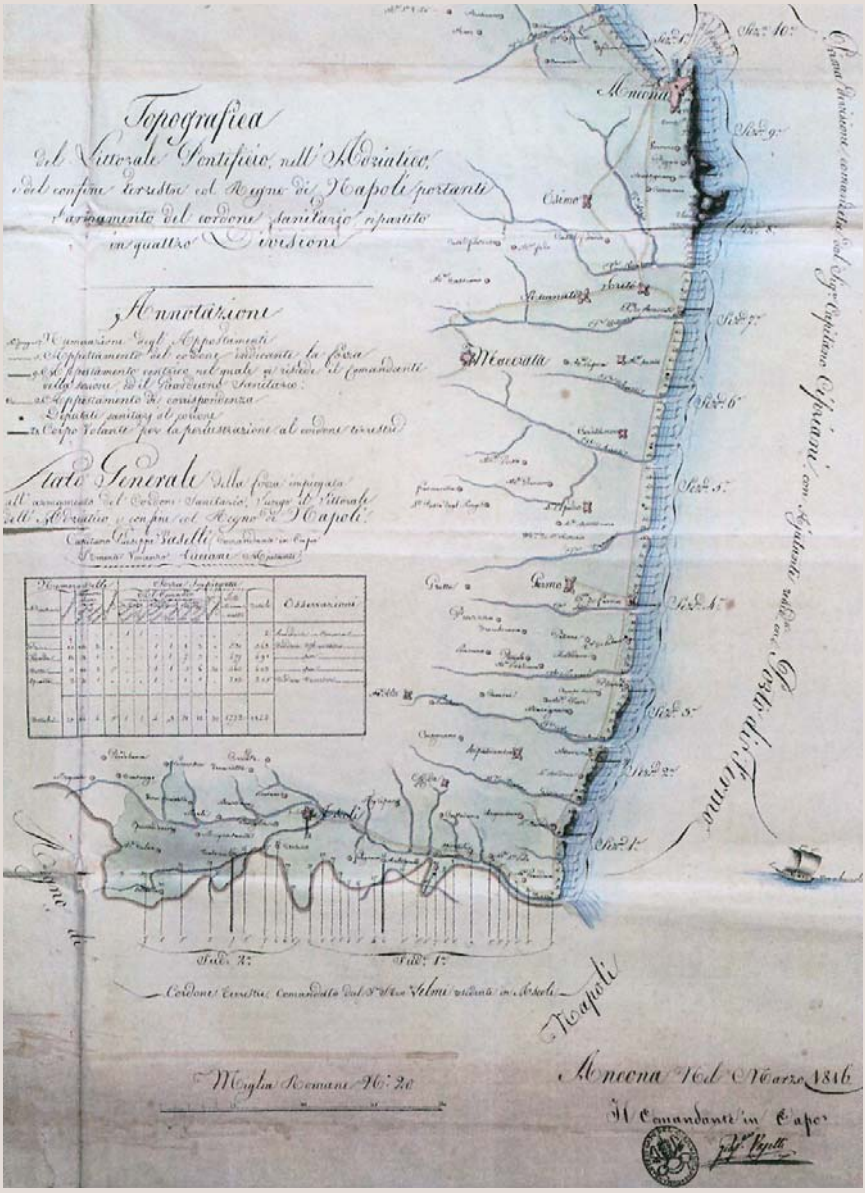



**Figure 10.** Divisions 1 and 4 of the *cordon sanitaire* of the Adriatic coast of the Papal States, 1816. See text for a description of the map elements.

*Source:* Appendix 1 (15).

***Slika 10.*** *Prva i četvrta divizija sanitarnoga kordona Papinskih Država na jadranskoj obali iz 1816. Za opis stavki na karti vidi tekst.*

Izvor: *Dodatak 1 (15).*

## 2.4 Kingdom of the Two Sicilies (Naples)

The regular attacks by Turks, Barbary Coast and Corsican pirates from the Middle Ages onwards upon the coastline of the provinces which ultimately comprised the Kingdom of the Two Sicilies meant that the Kingdom had an extensive system of coastal defensive towers which could be used and extended to provide a maritime *cordon sanitaire* in time of plague. The defensive system reached its final specification in the *Regolamento generale di servizio sanitario marittimo, sanzionato da S.M. il 1 gennajo 1820, in esecuzione dell'articolo 20 legge de' 20 ottobre 1819* [5]. *Inter alia*, paragraphs 219–235 of the general service regulations specify the geographical structure of the *cordon*, its manning, operation and reporting system. Table 1 lists the critical elements, while Figure 11 converts these into a schematic diagram; (A) shows the implied arrangement of guard posts along the coast and (B) illustrates the hierarchical reporting system. Many of the features of (A) and (B) – for example, the siting of posts within viewing distance of each other, the complement of three soldiers per post, and the reporting structure – have been noted earlier as the practice for the coastlines of the Republic of Genoa and the Santa Sede.

A handful of maps of parts of the *cordon sanitaire* for the Kingdom have survived in the State Archives of Naples and Palermo which show the realization of the prevailing legislation on the ground at the time of the Plague of Messina, 1743, and it is to these that we now turn.

### Sicily, 1743: The Plague of Messina (northeast Sicily)

The Plague of Messina was the last major outbreak of plague in Europe. Messina had been free from plague since 1624, and the Sicilians prided themselves on the rigour of their quarantine laws which they thought had preserved them. In May 1743 a Genoese vessel arrived in Messina from Morea (near Patras in the Little Dardanelles), on board of which had occurred some suspicious deaths (plague was present in the Levant at this time). The ship and cargo were burnt but, soon after, cases of a suspicious form of disease were observed in the hospital and in the poorest parts of the town. *The Supremo Magistrato di Commercio* preferred commercial expediency to rigorous enforcement of the sanitary laws and a major epidemic of plague developed which killed an estimated 40-50,000 persons. It was this plague which led to the establishment of the island-wide permanent sanitary magistrature with jurisdiction over the pre-existing local health deputations which had existed for decades to control the importation of infectious diseases.

**Table 1.** Kingdom of the Two Sicilies: Geographical structure of the *cordon sanitaire* specified in the general service regulations of 1820

| Paragraph | Regulation | Cordon structure |
|---|---|---|
| Geographical features | | |
| 221 | La distanza tra un posto e l'altro dev' esser tale, che l'uno sia sempre a vista dell' altro | Each guard post to be within sighting distance of its neighbours |
| 222 | Quando in una provincia o valle vi sieno delle coste inaccessibili, per le quali vi ha bisogno di poca o niua custodia, l'Intendente deve impiegare questo risparmio di forze de cordone per assicurare le spiagge aperte, ed i siti più esposti a degli sbarchi furtive | Any economies in manpower from not having to patrol inaccessible coastal sections to be used to guard open beaches and places most available for clandestine landings |
| Integrity of the cordon | | |
| 229 | Gli obblighi di tutti gl'individui destinati a formare il cordone, si riducono generalmente ad impedir nelle spiagge l'approdo di qualsivoglia legno, qualunque ne sia la provegnenza, obbligandolo a dirigersi ne'punti più vicini, ove risiede una deputazione de salute | All individuals in the cordon must act to prevent, through a general reduction of manpower, unauthorised beach landings by boat by funnelling those concerned towards the nearest points manned by sanitary officers |
| 230 | Ne' casi di burrasca, i legni amici o nemici possono, quando il naufragio è quasi sicuro, farsi approdare nelle spiagge, impiegando all' uopo tutte le cautele di custodia, ed un rigoroso cordone *parziale*, sino a che non accorrano i deputati di salute corrispondenti per applicarvi l'analogo trattamento sanitaria | Shipwrecks to be quarantined by a local *cordon sanitaire* until sanitary officers can attend |
| 231 | Se qualche posto fosse minacciato da gente, che volesse sbarcare a viva forza, ed alla quale non potesse resistere, il capo posto deve innalzare un bandiera di convenzione, ed a questo segnale deve accorrere subito la forza de' posti limitrofi. Avvenendo questo caso in tempo di notte, il segnale per aver soccorso sarà di due fuochi consecutive | Post heads must signal for support from neighbouring posts if a forced landing is threatened. Two consecutive fire signals used at night |

| Paragraph | Regulation | Cordon structure |
|---|---|---|
| 232 | In ogni posto devono farsi, durante la notte, de'fuochi convenuti di corrispondenza, a fin di assicurarsi della vigilanza de'posti limitrofi. | Fire signals to be agreed between adjacent posts for night communication |
| 233 | Nei tempi di cordone l'esercizio della pesca non è più libero. Le barche pescarecce possono uscire dal levare al tra montar del sole; ed in questo periodo è anche proibito loro di allontanarsi dal lido oltre le quattro miglia. I padroni di queste barche devono essere allora muniti di una *bolletta*, che i deputati di salute corrispondenti devono loro vistare giorno per giorno | A charge is made for fishing during times of cordon, collected daily by the sanitary inspectors from the boat captain. Fishing is permitted only during daylight hours and not more than four miles from the beach. |
| 235 | I cordone sanitari marittimi possono anche stabilirsi per mezzo di altrettante crociere di barche armate, applicandosi a queste, sotto certe tali necessarie modificazioni, le norme di sopra indicate per la distribuzione, il servigio e la dipendenza de' posti situati a terra su i littorali | Armed boats (*felucca*) patrol the coastline |
| Manning | | |
| 223 | In ogni posto devono montar di guardia tre individui ed un basse uffiziale, che farà le funzioni di capo posto. Quando le spiagge sieno aperte ed esposte in modo che non bastion a custodirle in quattro individui destinati per ciascun posto, puì allora aumentarsene il numero a seconda del bisogno e delle circostanze | Normally three guards per post with a low-level official as head of post; four on open beaches difficult to guard, augmented if necessary to suit the conditions |
| 224 | La guardia dee recarsi al suo posto la mattina, ed esserne rilevata il domane alla stess'ora, durante il qual tempo è vietato agl'individui che la compongono, il potersi appatare dal posto sotto qualunque pretesto. Il capo-posto dee rimaner fisso per un'inera settimana, ad oggetto di conoscer bene le consegne e trasmetterle, e di conoscere i segnali e le pratische da osservarsi. Egli ha l'obbligo particolare d'invigilar sulla condotta de'suoi subaltern | Guards must be on station from daylight and relieved the following morning. The head guard has a one-week tour of duty; he has recording, reporting and supervisory duties |

| Paragraph | Regulation | Cordon structure |
|---|---|---|
| 225 | Per ogni sei posti vi sarà un'Uffizial comandante, che dee rimaner distaccato per l'intera settimana, e tener presso di se una o più persone a cavallo per la sollecita diramazione degli ordini. La posizione da assegnarsi al suddetto Comandante sarà, per quanto è possible, la centrale. Egli avrà specialmente l'incarico d'invigilare all'adempimento degli oblighi ingiunti a(i)l capi-posti | A sanitary official every six posts, centrally located, on a weekly tour of duty. The official is responsible for distributing orders rapidly using horsemen |
| 226 | Per ogni tre distaccamenti di sei posti l'uno, vi sarà un sottoispettore, che anche deve avere una situazione centrale. Il suo incarico è quello d'invigilare alla regolarità del servisio de'tre distaccameni che compongono la sua sotto-ispezione | Three detachments per six posts under the supervision of an under-inspector in a central position |
| Reporting system | | |
| 228 | Tra tutt' i capi del cordone vi deve essere una corrispondenza giornaliera ed esatta, onde si rilevi il modo con cui si attende al servizio, e le novità che possono avervi luogo. Affinchè la corrispondenza suddetta proceda colla massima regolarità, e nel modo più celere, i capi-posti devono corrispondere coi rispettivi Comandanti di distaccamento, questi col sotto-ispettore, il sotto-ispettore col' Ispettore, l'Ispettore contemporaneamente coll' Intendente, e col Comandante militare della provincia o valle. Da siffatta regola sono eccettuati i casi di seria considerazione ne' quali, oltre del rapporto regolare da passarsi col cennato metodo, i Comandanti di distaccamento sono autorizzati di far rapporto straordinario, e spedirlo con espresso all' Intendente ed al Comandante della provincia o valle | Cordon commanding officers must communicate daily with each other. The normal upwards reporting system is from local guard post heads via intermediate officers to the provincial military commander and the sanitary superintendent (Figure 11B); the intermediate officers can be by-passed in an emergency |

*Source*: based on Petitti (1852, pp. 318–55).

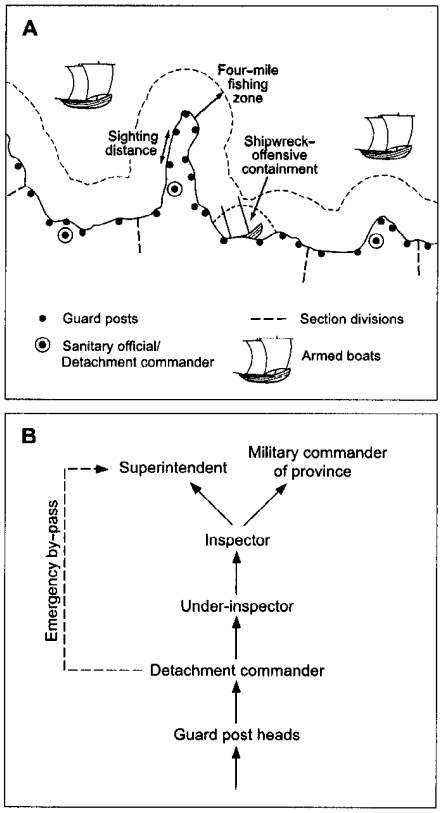



**Figure 11.** Kingdom of the Two Sicilies: Maritime *cordon sanitaire*. (A) Arrangement of guard posts along the coastline recommended in the general service regulations of 1819–20 (Table 1). (B) Reporting system for the *cordon*.

**Slika 11.** *Kraljevstvo dviju Sicilija – Pomorski sanitarni kordon. (A) Raspored stražarnica duž obale prema preporuci iz općih vojnih propisa iz 1819.–20. (Tablica 1.). (B) Sustav dojavljivanja unutar kordona.*

Once the epidemic began to rage in Messina, the sanitary magistrates of the republics and provinces across Italy activated their maritime *cordon sanitaires* and imposed suspensions upon contact with Messina. Figure 12 shows the *cordon sanitaire* for the province of Lecce on the heel of Italy and adjacent to Messina. Consistent with the legislative framework summarized in Table 1 and Figure 11, the plate shows the division of the coastline into sections (pecked lines), with the regular and dense network of masonry towers (*torre*, housing the local sanitary official and section commander; large red circles on Figure 12) and guard huts (*barracca*, each housing three guards or *uomini di guardia*; black lozenges on Figure 12).

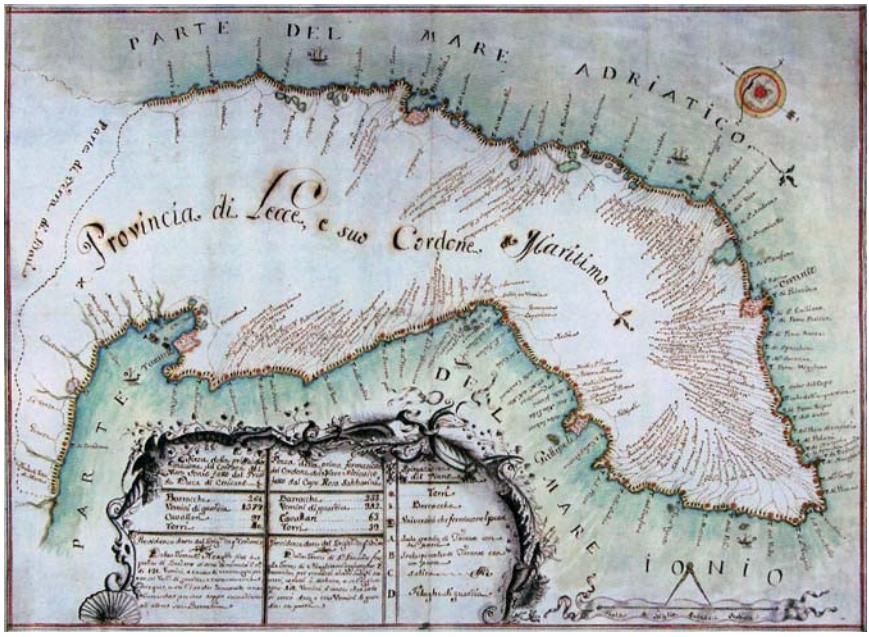



**Figure 12.** Province of Lecce, 1743, *cordon sanitaire*. (A) Distribution of towers and guard huts comprising the *cordon sanitaire*. The table gives manning details. (B) Enlargement of the southeast tip showing the geographical congruence of the *cordon* with the legislative framework summarized in Table 11.2.

*Source*: Appendix 1 (18).

***Slika 12.*** *Pokrajina Lecce 1743., sanitarni kordon. (A) Raspored promatračnica i stražarskih kućica obuhvaćenih sanitarnim kordonom. Pojedinosti o posadama su u tablici. (B) Uvećani jugoistočni vrh pokazuje geografsku podudarnost kordona sa zakonskim okvirima kratko opisanima u tablici 11.2.*

Izvor: *Dodatak 1 (18).*

Armed patrol boats (*feluccas*) appear offshore (Article 235 in Table 1). The entablature gives the manning details for this *cordon*; 494 guard huts, 79 towers, 2,319 *uomini*, and 160 *cavallari* (horsemen) along *c*. 400 km of coast. During the epidemic, a Turkish ship was unfortunate enough to be shipwrecked off the port of Lecce. Following Article 230 of the General Regulations in Table 1, a local cordon was established around the wreck, and this is illustrated in Figure 13.

To prevent spread within Sicily, three internal cordon lines were established in August 1743 by the health officials in Palermo, stretching across the neck of land from Milazzo on the north coast to Taormina on the

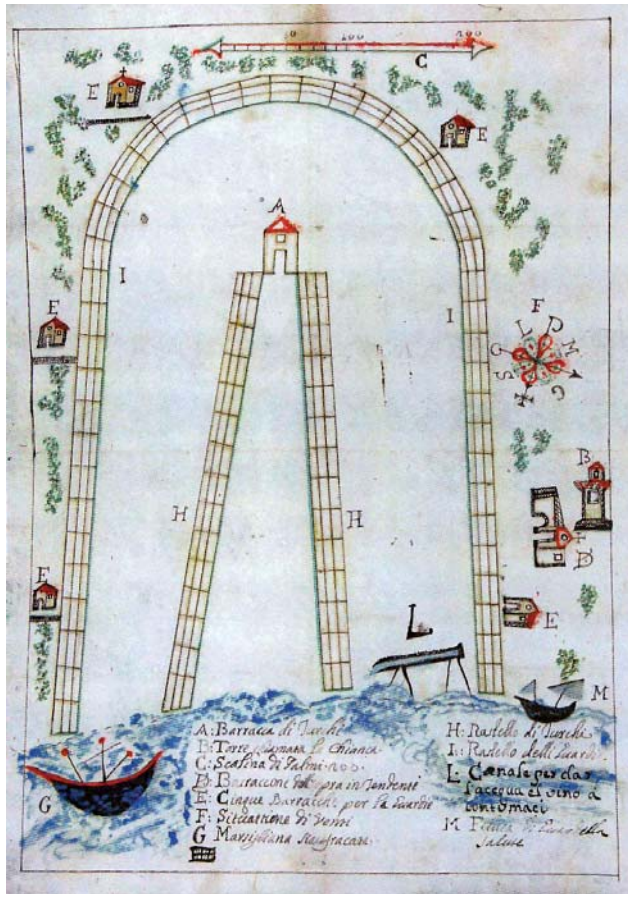



Figure 13. Lecce, tower of Chianca, 1743: Local *cordon sanitaire*. At the time of the Plague of Messina, a Turkish boat was unfortunate enough to be shipwrecked near the Tower of Chianca, Lecce harbour. The plate illustrates the local offensive containment *cordon sanitaire* erected around the wreck to prevent any risk of plague being carried by the sailors into Lecce. It shows the hut for the Turks (A), Chianca tower (B), the five sanitary guard huts (E), the stockades used to separate the Turkish compound from the guards (H, I), an armed patrol boat (*felucca*, G) and the *felucca* with the public health officers on board (M).
*Source*: Appendix 1 (19).

*Slika 13. Lecce, toranj Chianca, 1743. Lokalni sanitarni kordon. Kada je Messinom harala kuga, zla je kob nanijela turski brod da se nasuče na obali blizu tornja Chianca luke Lecce. Tabla prikazuje sanitarni kordon ofenzivno podignut oko nasukanoga broda kako bi se spriječili mornari da prenesu kugu u Lecce. Vidi se turska koliba (A), toranj Chianca (B), pet sanitarnih stražarnica (E), ograde od stupova koje odvajaju turski kamp od stražara (H, I), naoružana patrolna feluka (G) te feluka s javnozdravstvenim časnicima (M).*
Izvor: *Dodatak 1 (19)*

south (Figure 14). From east to west, the cordon lines were: (east) 26 miles (42 km) long, number of posts and men unrecorded; 23 miles (37 km), 152 posts, 700 men; 21 miles (34 km), 130 posts, 633 men (west). This offensive containment appears to have worked for there is no surviving evidence that plague spread to other parts of the island. An external cordon was also maintained around Sicily during the epidemic, and this may account in part for the lack of spread beyond Messina.

### Bari

Although we have focussed upon the Plague of Messina in describing the cordon arrangements for the Kingdom of the Two Sicilies, the system was in operation in earlier centuries. For example, the offensive containment of Bari is depicted cartographically in a monograph published at Naples in 1694 by Filippo de Arrieta, a professional administrator who served as Royal Auditor of the province of Bari in the domain of the Kingdom of Naples. The English title is *Historical Report on the Contagion that Occurred in the Province of Bari in the Years 1690, 1691 and 1692*. As described in Jarcho [33], de Arrieta's engraved map (Figure 15) shows about 170 km of the Adriatic coastline, almost from Manfredonia to Brindisi, and the terrain extending inward for a maximum of 50 km. Bari is shown as having been isolated from its neighbours by a cordon, depicted as a dashed line, along which are shown tents, each surmounted by a triangular pennant (cf. Figure 6 for Venice). Of the segregated terrain a small part along the Adriatic is marked off by a smaller and thicker border, which describes a circumvallation 125 km long. The thicker line was composed of 350 huts joined by a wall of living rock 4 to 5 palms high. The huts were an eighth of a league apart. Within the district cordoned off by heavy palisaded circumvallation are places marked by the letter D to indicate existing infection and places marked with a C to designate former infection. The segregation was completed on the Adriatic side by a row of guard boats, two of which are shown. Each has a cabin at its stern and a crew of seven or eight men.

## 3. Planning for plague outbreaks

In 1700, the eminent Bolognese naturalist and geographer, Luigi Ferdinando Marsili (1658-1730) produced the remarkable map shown in Figure 16, fifteen months after the Treaty of Karlowitz (1699) which concluded the Austro-Ottoman War of 1683-97. The map was either prepared for or by Marsili who was serving the Habsburg Emperor Leopold I in a Danubian campaign against the Ottoman Empire at the time.

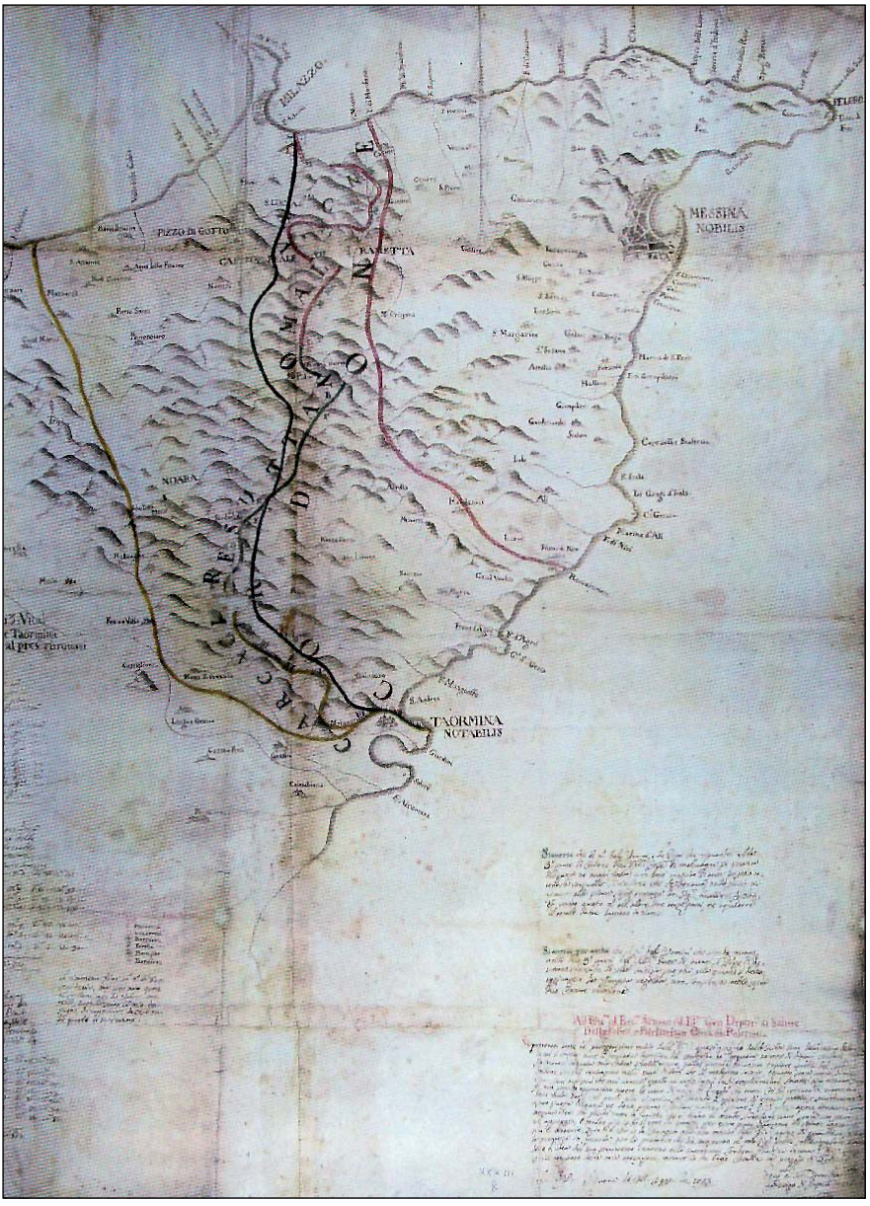



**Figure 14.** Plague of Messina, 1743: Offensive containment. Location of three internal *cordon sanitaire* lines running north–south used to isolate Messina from the rest of Sicily. *Source*: Appendix 1 (20).

***Slika 14.*** *Messinska kuga iz 1743. Ofenzivno suzbijanje. Vidi se položaj tri unutarnje linije sanitarnih kordona od sjevera prema jugu kojima se Messina izolirala od ostatka Sicilije.* Izvor: *Dodatak 1 (20)*.


**Figure 15.** Offensive containment for Bari, 1690–92. See text for map description.

*Source*: Appendix 1 (22).

***Slika 15.*** *Ofenzivno suzbijanje kuge u Bariju 1690.–92. Za opis karte vidi tekst.*

Izvor: *Dodatak 1 (22)*.

Marginal map notes describe Marsili's map as a "copy", and hint that it may have been copied from a (Habsburg?) original. It appears to have been one of two maps in a series, the second of which is missing [33, p. 11 and appendix source 23]. Turkey was one of the principal conduits of plague into Europe, and the Habsburgs were constructing a *cordon sanitaire* against plague in this area from the latter years of the seventeenth century [34] which, by 1770 extended along more than 1000 miles of frontier between Austria and the Ottoman Empire [34, p. 16].

The map is entitled *Mappa geographica qua preacautio contra pestem post factam locorum, iuxta Pacis Instrumenta, Evacuationem ac Demolitionem in Confinibus istis Cis-Danubialibus instituenda ostenditur* (A Geographical map in which are shown the precautions that are to be taken against the plague within these Cis-Danubial regions after the evacuation and demolition of places in accordance with the peace treaties). The map is at a scale of roughly 1:200,000 (see appendix source 23) and was drawn with south at the top. It shows the eastern coast of the Adriatic from Sebenico (now Šibenik) to Fiume (now Rijeka), a distance of approximately 220 km, and the territories of Croatia, Bosnia, "Sclavonia" and Sirmium as far inland as Belgrade.


**Figure 16.** Planning for plague containment in the Cis-Danubial regions, 1700. Marsili's map envisages clearing of the area of population and houses, along with the maintenance of trade along strictly defined routes.

*Source*: Appendix 1 (23).

***Slika 16.*** *Plan suzbijanja kuge u podunavskim regijama iz 1700. Na Marsilijevoj se karti predviđa iseljavanje stanovništva i odvođenje konja iz područja te pridržavanje jasno utvrđenih trgovačkih ruta.*

Izvor: *Dodatak 1 (23)*.

The map shows provincial boundaries, two plague cordons (solid black lines and dots) determined by mountain tops, and several lazarettos. A linear scale of hours (travel times) appears in the lower left and a detailed explanation in the upper left. To control the spread of plague if it visited the region, the map proposes that the residents of the region lying south of the yellow line have to be assumed to be susceptible to the disease, and should be detained in the lazar houses which appear at road intersections, to serve their quarantine. Merchants could continue to follow the roads shown by the double pecked lines but all other roads were to be closed to prevent spread of infection. The defence against the plague was not limited to isolation by cordon and lazaretto since the descriptive note states that the system was to be instituted after depopulation of the area by evacuation and demolition of houses. The combined preservation of commercial routes, cordons, lazarettos and checkpoints amounts to "an almost complete depiction of the way in which plague was resisted" [33, p. 11].

## 4. Conclusion

Using largely unknown and previously unpublished maps in Italian state archives, this paper has shown how, from the establishment of the first quarantine station by the Republic of Ragusa (modern-day Dubrovnik) in 1377, the states and principalities of Italy developed a sophisticated system of defensive quarantine in an attempt to protect themselves from the ravages of plague. A *cordon sanitaire* existed around the coast of Italy for several centuries, consisting of three elements: (i) an outer defensive ring of armed sailing boats in the Mediterranean and the Adriatic, (ii] a middle coastal ring of forts and observation towers, and (iii) an inner defensive ring of land-based cavalry. The principles established, although not especially successful at the time against a disease of (then) unknown aetiology, are still used today in attempts to control the spread of infections of animal and human populations [35, pp. 649-52].

## Appendix 1: Map Sources

This Appendix gives the sources of the maps used in this paper. The item numbers correspond with the key map shown in Figure 5. All plates with sources cross-referenced to this Appendix have been reproduced by kind permission of the Directors of the State Archives and Libraries cited.

### Venice
### Archivio di Stato di Venezia (ASV)

1. Giancomo Binard

*Mappa del territorio del basso Friuli compreso tra Palma la linea formata dal- l'Iudri, il Torre e l'Isonzo e Cervignano, con l'indicazione delle postazioni sanitarie*. 4 marzo in Udine; scala di miglia 3 = mm 30; dim mm 940 × 650. Disegno a mano, su carta, con colorazioni ad acquarello. ASV. Provveditori alla Sanità, Disegni, B2N8.

2. Iacopo Spinelli

*Mappa con parte del corso del fiume Natisone e tracciate le postazioni di guardia al confine tra il Friuli e la Schiavonia veneta in caso di epidemie*. 1714; scala di miglia = mm 90; dim mm 1,025 × 720. Disegno a mano, su carta, con colorazioni ad acquarello. ASV. Provveditori alla Sanità, Disegni, B3N12.

3. Tommaso Pedrinelli

*Mappa comprendente parte del territorio Vicentino dei Settecommni e Bassanese al cinfine con il Trentino e con l'indicazione dei posti e guardie sanitarie.* 28 febbraio 1739, Bassano; scala di miglia italiane 5 = mm 155; dim mm 1,140 × 975. Disegno a mano, su carta, con colorazioni ad acquarello. ASV. Provveditori alla Sanità, Disegni, B3N16.

4. P. Guiseppe Di San Francesco

*Mappa con la linea di confine tra l'Istria veneta ed il territorio austriaco e gli appostamenti sanitari posti da Zaule, territorio di Muia e Fiauona, territorio d'Albona*. 1712; scala di miglia italiane 5 = mm 162; dim mm 1,230 × 1,305. Disegno a mano, su carta, con colorazioni ad acquarello. ASV. Provveditori alla Sanità, Disegni, B1N16.

5. Pietro Soranzo

*Mappa del territorio di Imoschi (Dalmazia veneta) confine con l'Impero Ottomano, con il territorio Sign, di Duare e di Vergoraz ed i caselli ed appostamenti sanitari.* 18 novembre 1783; scala passi veneti 2400 = mm 130; dim mm 1,570 × 765. Disegno a mano, su carta, con colorazioni ad acquarello. ASV. Provveditori alla Sanità, Disegni, B4N21.

6. Giancomo Pellegrini

*Mappa con il litorale di Monfalcone da Porto Anfora al castello di Duino e con l'indicazioni dei posti di guardia sanitari al confine con gli arciducali*. 13 novembre 1713, Monfalcone; scala miglia Quattro = mm 140; dim mm 1,430 × 675. Disegno a mano, su carta di più pezzi uniti insieme e riforzati con tela, con colorazioni ad acquerello. ASV. Provveditori alla Sanità, Disegni, B1N3.

7. (Unknown)
Colognese (Territorio)

*Mappa del territorio colognese, al confine con le province di Padova e Vicenza, con i castelli e le separazioni stabilite dal Provv. Gen. in T.F. in occasione di una epidemia bovina.* 10 guigno 1747; dim mm 420 × 340. Disegno a mano, su carta, con colorazioni ad acquarello. ASV. Provveditori alla Sanità, Disegni, B4N19.

8. Gio. Giancomo Pelligrini
Monfalcone (Territorio)

*Mappa del territorio di Monfalcone compreso tra il lago di Pietra Rossa e il corso del fiume Isonzo con l'indicazione delle ville, posti e caselli di guardia sanitari al confine con il granducale.* 1713; di miglia due = mm 123; dim mm 1,400 × 700. Disegno a mano, su carta, di due pezzi uniti insieme rinforzati con tela, con colorazioni ad acquarello. ASV. Provveditori alla Sanità, Disegni, B5N26.

9. Bartolo Riviera
Friuli

*Disegni con raffigurati gli appostamenti di cavalleria e di fanteria creati ai confini del Friuli in occasione di epidemie.* (Att. Linea di confine per contaggio dei Bovini fatta nel Friuli – 87). Sec. 18; dim mm 1,040 × 395. Disegno a mano, su carta di due pezzi uniti insieme, con colorazioni ad acquarello. ASV. Provveditori alla Sanità, Disegni, B5N27.

10. Gio Batta Cavalcaselle
Veronese (Territorio)

*Mappa con parte del territorio veronese al confine con il mantovano e il ferrarese e con la descrizione di vari caselli sanitari.* Sec 18; scala di miglia di circa = mm 125; mm 958 × 730. Disegno a mano, su carta rinforzata su tela con colorazioni ad acquarello. ASV. Provveditori alla Sanità, Disegni, B5N29.

11. Unknown
Budua (Territorio Di)

*Mappa comprendente un tratto di mare tra Porto Rose e Castel di Lastva ed i territori di Cattaro Zupa, Budua, Maini e Pastroviech con l'indicazione dei posti di confine.* Sec 18; dim mm 785 × 580. Disegno a mano, su carta di due pezzi uniti insieme e rinforzata con tela, con colorazioni ad acquarello. ASV. Provveditori alla Sanità, Disegni, B6N34.

12. Vicenzo Bernardi
Adige (Fiume)

*Parte del corso del fiume Adige all'altezza di Ossevigo in territorio veronese, con l'indicazione degli appostamenti al confine, lungo la strada postale.* Sec 18; scala pertiche veronesi 100 = mm 180; dim mm 1,260 × 720. Disegno a mano, su carta di più pezzi uniti insieme, con colorazioni ad acquarello. ASV. Provveditori alla Sanità, Disegni, B7N43.

## Genoa
## Biblioteca Civica Berio

13. Matteo Vinzoni

*Piante delle due Riviere della Serenissima Repubblica di Genova. Divise Ne. Commissariati di Sanita. Cavate Dal M. Col. Ing. Matteo Vinzoni. Per Ordine Dell' Ill Mag. di Sanita.* 1758; mm 528 ×355; cc. 119 complessive, num nel sec XVIII per pagg 230 (escluso il foglio di guardia ant. e il front.). Mostra di manoscritti e libri rari della Biblioteca Civica Berio, Genova.

## Santa Sede (Holy See)
## Archivio Di Stato Di Roma (ASR)

14. Gaspare Grassellini

*Carta topografica sanitaria del littorale del Mediterraneo nello Stato Pontificio dal confine del Gran Ducato di Toscana quello del Regno di Napoli nel rapporto di 1 a 1000000. Compilata nel Dicastero Generale del Censo essendo Pro Presidente sua eccnza RMA Monsignor Gaspare Grassellini per uso della Congregazione Generale di Sanit*à. 9 decembre 1843. Scala 1:100,000; dim mm 2,790 × 415; disegno a penna su carta, colorato. ASR. Disegni, Coll I cart 106f, 215.

15. Guiseppe Vaselli

*Topografica del Littorale Pontificio, nell' Adriatico, e del confine terrestre col Regno di Napoli portante l'armamento del cordone sanitario, ripartito in quattro Divisioni (Stato generale della forza impiegata dell' Adriatico, e confine col Regno di Napoli)*. Ancona, marzo 1816. dim mm 550 × 1,580; disegno a penna su carta, colorato. ASR. Disegni, Coll I cart 106f, 218.

## Tuscany
## Archivio di Stato di Firenze (ASF)

16. Unknown
Livorno (Torri Costiere)

*Piano specificazione e stato delle Torri e Posti che sono situati sul Lido del Mare da Livorno fino a Torre Nuova, aumentati in occasione della contumacia della Città di Messina dell'anno MDCC XLIII (1743)*. 1743. Scala di miglia italiane 10 = mm 215;

dim mm 435 × 1,385; disegno a penna su carta, colorato. ASF. Miscellanea di piante 5/20, 38.

17. P Giovanni Fabbroni
Toscana (Torri Costiere)

*Pianta della costa del Mare Toscano guarnita con tutte le sue Torri e Casotti fatta in occasione della Peste di Messina l'anno MDCCXXXIII principiando dalla Torre del Cinquale fino alla Torre di Cala del Forno che confina con lo Stato di Orbetello.* 1754. Scala di miglia 6 = mm 76; dim mm 770 × 2,110; disegno è penna su carta telata, colorato. ASF. Disegni, Miscellanea di piante 5/20, 258.

## Naples
## Archivio di Stato di Napoli (ASN)

18. Augustin De Bargas Machuco
Lecce

*Piano dimostrativo della marina di Lecce e del suo cordone marittimo.* 1743. Scala di miglia quindici italiane pari a mm 95; dim mm 355 × 485 (350 × 480); disegno a inchiostro acquerellato. Segreteria di Stato d'Azienda, fs. 253, fascic. 20.

19. Soprintendenza Generale Della Salute
Lecce, Chianca Di

*Pianta delle baracche e rastelli fatti costruire per la custodia dei Turchi naufragati nella marina della torre della Chianca di Lecce.* 1743. Scala di palmi 200 pari a mm 110; dim mm 415 × 285 (385 × 265); disegno a inchiostro acquerellato. Segreteria di Stato d'Azienda, fs. 252, fascic. 38.

20. Vicari Generali (General Vicars)

MESSINA, 1743. *Relazione topografica dell' intèro cordone, commandato dalli 3: Vica*$^{i}$ *Gener*$^{i}$ *il quale hà li suoi termini nelli due mari di Milazzo, e Taormina che per linea retta saria miglia so mà per tortuosa come al pres ritrouasi si estende a miglia.* Dim mm 910 × 920; disegno a inchiostro acquerellato. Piante e disegni, busta XXXIII, 8.

## Palermo
## *Archivio di Stato di Palermo* (ASP)

21. Alì Innocenzo: Ministero E Real Segreteria Di Stato Presso
Il Luotenente Generale In Sicilia, Ripartiment Lavori Pubblica.

*Pianta topografica del littorale della valle di Siracusa distinto nei littorali rispettivi di ogni comune e con l'indicazione dei posti di cordone sanitario terrestre.* Siracusa 30 April 1837. Miglia siciliani; dim mm 920 × 1,310; disegno a penna su carta, colorato.

**Bari**
**Wellcome Trust Medical Photographic Library, London**

22. F. De Arrieta

*Ragualio historico del contaggio occorso nella provincial di Bari negli anni* 1690, 1691, *e* 1692. (Naples, Parrino and Mucii, 1694). 324 × 180 mm. Scale ≈ 1:500,000. The map is on p. 183.

**University of Bologna**
**Library of the University of Bologna**

23. L. F. Marsili

*Mappa geographica, qua praecautio contra pestem post factam locorum, juxta pacis instrumentum, evacuationem ac demolitonem in confinibusistis Cis Danubialibus instituenda ostenditur*. See Frati, L. (1928). *Catalogo dei Manoscritti di Luigi Ferinando Marsili Conservati nella Biblioteca Universitaria di Bologna*, p. 213, entry 25 (Firenze: Olschki). A manuscript map prepared by or for Marsili and dated April, 1700. Dimensions: mm 224 × 130, Scale ≈ 1:500,000.

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**Sažetak**

*Nakon uspostave prvoga lazareta u Dubrovačkoj Republici 1377., talijanske državice i kneževine razradile su sustav karantena kako bi se zaštitile od razarajućega djelovanja kuge. Oslanjajući se mahom na dosad nepoznate povijesne karte, u ovome se članku rekonstruira kako je i u kojem razmjeru djelovao sustav zaštite. Duž talijanske obale stoljećima je postojao sanitarni kordon, a sastojao se od tri dijela: (i) vanjski pojas sastavljen od naoružanih jedrenjaka na Sredozemnom i Jadranskome moru, (ii) srednji obrambeni pojas sastavljen od utvrda i promatračnica te (iii) unutarnji obrambeni pojas na kopnu sastavljen od konjice. Premda ovaj sustav svojevremeno i nije bio pretjerano uspješan u zaštiti od bolesti (tada) nepoznate etiologije, njegova se načela još uvijek rabe za sprječavanje širenja bolesti među ljudima i životinjama.*

**Ključne riječi:** *povijest medicine, XIV. do XIX. stoljeće, zarazne bolesti, kuga, geografsko širenje, suzbijanje, Italija*

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