



Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Elsevier hereby grants permission to make all its COVID-19-related research that is available on the COVID-19 resource centre - including this research content - immediately available in PubMed Central and other publicly funded repositories, such as the WHO COVID database with rights for unrestricted research re-use and analyses in any form or by any means with acknowledgement of the original source. These permissions are granted for free by Elsevier for as long as the COVID-19 resource centre remains active.



The nineteenth-century experience of the kingdom of the two Sicilies on mandatory vaccination: An Italian phenomenon?



Maurizio Bifulco ^{a,*}, Erika Di Zazzo ^b, Simona Pisanti ^c, Mariano Martini ^d, Davide Orsini ^e

^a Department of Molecular Medicine and Medical Biotechnologies, University of Naples “Federico II”, Naples, Italy

^b Department of Medicine and Health Sciences “V. Tiberio”, University of Molise, Campobasso, Italy; UOC Laboratorio Analisi P.O. “A. Cardarelli” Campobasso, Italy

^c Department of Medicine, Surgery and Dentistry ‘Scuola Medica Salernitana’, University of Salerno, Salerno, Italy

^d Department of Health Sciences, University of Genoa, Genoa, Italy

^e University Museum System of Siena (SIMUS), History of Medicine, University of Siena, Siena, Italy

ARTICLE INFO

Article history:

Received 10 November 2021

Received in revised form 22 March 2022

Accepted 14 April 2022

Available online 6 May 2022

Keywords:

COVID-19 vaccine

Compulsory vaccination

History of vaccine

Prevention

ABSTRACT

The current health emergency caused by COVID-19 disease shows several similarities with well-known epidemics of the past. The knowledge of their management and overcoming could give us useful tools to face the present COVID-19 pandemic. The Bourbon king Ferdinand I planned the first free large-scale mass vaccination programme conducted in Italy and one of the first in Europe to counteract smallpox. The vaccination campaign was characterized by many difficulties and the efforts made by the Southern Kingdoms governors were enormous. For example, the “ante litteram communication campaign”, aimed at convincing the so-called “hesitant” people and at confuting the arguments of vaccination opponents, was impressive. In 1821, the compulsory vaccination significantly reduced smallpox infections and death rates. Subsequently, several experiences followed this initiative, not without doubts and debates. Smallpox was finally eradicated worldwide only on the 9th December 1979.

Despite to other countries, the “mandatory vaccination” is a topic often debated by Italian scientific and social communities.

© 2022 Elsevier Ltd. All rights reserved.

In the early 21st century, the hygienic conditions improvement and the implementation of pivotal public health measures, such as mass vaccination campaigns, steadily declined infectious diseases as a cause of death over the years. However, the current COVID-19 pandemic revealed that an infection disease represents again a leading cause of death [1]. Despite the differences among the periods and the scientific/technological progress, the knowledge of how the tremendous smallpox epidemic was handled and finally overcome, could give us useful tools for the current COVID-19 pandemic management.

The history of vaccinations in Southern Italy dates to about 220 years ago, when Ferdinand I (King of the Two Sicilies from 1816), started the fight against smallpox in his reign [2].

Obviously, this vaccination programme was not exempt from criticism and elicited contrasting opinions; a lively scientific and cultural debate among supporters and opponents, often detractors raised up. Someone refused the vaccine for religious beliefs; other people showed reticence supposing that animal material inoculation induces animal diseases transmission. Moreover, it was feared

that the “arm-to-arm” technique used in vaccination provoked disease spreading, such as syphilis.

Currently, a lot of people are hesitant or refuse the vaccine [3]. For this reason, in Italy and in few other countries, COVID-19 reopened the discussion about mandatory vaccination, stressing further the debate at scientific, social, and political levels. However, the Medicine history provides several examples showing that compulsory vaccination represents the unique strategy to overcome long-lasting and lethal epidemics.

Naples has a particularly interesting ancient history in the field of vaccination. Indeed, the Bourbon’s government devoted a peculiar attention to vaccination along all its regency. The vaccination program, established by Ferdinand I started on the 14th of March 1801 and was among the first ones performed on a large scale in Italy and in Europe for free.

In the Sicilian constitution promulgated by Ferdinand I in 1812, the 11th chapter titled “Freedom, rights and duties of the citizen” reported as follow: “Every Sicilian citizen that do not vaccinate his children will not directly or indirectly participate to law nor will take part to the civic councils”. Additionally, the decree established that the Institutions responsible for the disadvantaged children care, were obliged to vaccinate the young guests within the

* Corresponding author.

E-mail address: maubiful@unina.it (M. Bifulco).

first month and store the certificate of this practice. Otherwise, the heads were removed and even obliged to pay the medical fees of the children hosted without vaccination (article four). Similarly, parents “who have held reprehensible conduct of neglecting vaccination in order to preserve their children” were punished by law, avoiding the access to any form of economic assistance by the Institution of the kingdom (article one). In fact, to benefit from the State’s assistance, it was necessary to show the certificate assessing the vaccination of the children and of all family members. The priest, endowed with a list of vaccinated people, gave them a sort of vaccination passport, similarly to the current “Green pass”, reporting the name, the date, and a unique identification number to avoid theft or identity exchanges (article two).

However, the decree promulgated by Ferdinand I had not only punitive purposes to discourage the anti-vaccine front. In article five the decree tried to persuade the “hesitant” people with some incentives. Each year the priests were in charge of organizing a lottery among the vaccinated and the lucky winner received a substantial cash prize [5].

Since 1808 to 1819, in Naples and in various provinces of the kingdom, taking advances of these political choices, were administered almost 400,000 free of charge vaccinations [4], more than 17% of all live new-borns in the kingdom.

The vaccination program reached a good result, but it was not enough to counteract the dangerous smallpox. Consequently, the sovereign and his scientific committee tried to make mandatory the smallpox vaccine extending this practice to most of the population, especially children. These past restrictions, maybe unknown to most people, reveal far-sightedness and innovation. On November 6th 1821, Ferdinand I signed the decree number 141 to establish, for the first time, the mandatory vaccination against smallpox in the Kingdom of the Two Sicilies.

In 1822, the first year of mandatory vaccination, were vaccinated 103,079 people [4]. It represented a relevant result, considering that it was performed about two centuries ago.

The subsequent decrees of January 27th 1831 and September 11th 1838 made the rules more stringent and characterized by an increased cooperation between church and state, in order to educate the people and convince families to vaccinate their children, to protect their health and life according to the duty imposed by God. Obviously, specific strategies of health education were taken to train medical staff to vaccination practices and inform the population about the importance of vaccination. For this task were also involved intermediaries like priests and midwives, to answer the most frequent questions, and to reply to vaccination opponents. Among the documents stored in the State Archives of Salerno, we find several reports inviting the priests, during their service, to raise awareness among the population about the necessity and usefulness of vaccination [6].

Finally, in 1888, the Crispi-Pagliani law introduced the first compulsory vaccination to limit the spread of smallpox in Italy.

The effectiveness of the first vaccination programs was quite fluctuating since in most cases the number of children vaccinated was absolutely lower than the total number of those who could have received the vaccine.

For example, with reference to the Terra d’Otranto which was part of the Kingdom of the Two Sicilies, Antonio Miglietta who chaired the Vaccination Directorate, reported 12,112 vaccinations out of a total of 119,442 new births carried out from 1810, the year from which the availability of data began, to 1816 equal to assuming an average of 230 human lives saved for each year. Although the data were absolutely comforting, they were significantly affected by the low percentage of vaccinated children [7].

In the territories beyond the Faro, a name that at the time indicated Sicily, and in particular the province of Catania, the percentages of vaccinated children slightly exceeded 50% of the newborn.

Similar situations also occurred elsewhere on the Italian peninsula. For example, in the Ombrone Department, corresponding to the current provinces of Grosseto and Siena, vaccinators managed to immunize an ever-increasing number of children in the early nineteenth century – 3,083 in 1810, 5,140 in 1811, 5,872 in 1812 – without however reaching the whole of the newborn. In this way, their action only allowed to contrast the spread of smallpox, without eradicate it: if in 1810 there were 296 cases of smallpox, with three deaths, the following year it passed to 80 cases and two deaths, but in 1812 returned to 118 cases and six deaths [8]. Following the promulgation of the Crispi-Pagliani law, the numbers relating to the effectiveness of vaccines became more relevant. In 1888, 65,000 cases of smallpox and 19,000 deaths from this disease were recorded, with a mortality rate of 61 per 100,000 inhabitants. Within a decade, thanks to vaccination, there was a rapid and clear reduction in cases which dropped to 3,000, with 300 deaths. In the early twentieth century these numbers increased again and then stabilized until the negative peak of 1919, evidently due to the years of conflict, when 34,000 cases and 16,000 deaths were reached in a single year [9]. Since the 1920s, the smallpox cases dropped significantly again, becoming very rare. The comparison of smallpox vaccines efficacy during the second half of the nineteenth century with other countries is also interesting. Prussia, that implemented the compulsory vaccination since 1874, reported a drop in the number of smallpox deaths from 105 per 100,000 inhabitants to less than 10 in a couple of years, settling in 1888 – the year in which Italy opted for mandatory vaccination – at 0.5 per 100,000 inhabitants.

With this background, nowadays, despite the current scientific knowledge, it is surprising that still many people remain hesitant or refuse vaccination even during the present COVID-19 pandemic.

It should be recognized and appreciated that mass vaccination campaigns have successfully led to smallpox eradication in 1979 and have drastically reduced the incidence of many diseases responsible of epidemics. Our chances to overcome COVID-19 pandemic are strictly dependent on the availability of the vaccine, and its relevant value should be appreciated now more than ever, since the scientific and the technological progress along with a worldwide coordinated effort of the scientific community made it possible to develop several efficient vaccines in a very short time [8]. The collected data on COVID-19 vaccines provided by scientific community demonstrate their efficacy and safety, despite rare adverse events, that are unavoidable on a large scale for every commercialised drug or vaccine. It is a matter of fact that COVID-19 vaccination has shown efficacy in the reduction of COVID-19 related mortality and hospitalization. As in the past, an efficient mechanism to enforce vaccination compliance has been the obtaining of a vaccine certificate (Green pass) to receive social benefits or avoid restrictions.

However, the extreme and coercive public health measures proposed in the last months induced strong reactions from vaccine opponents and raised a lively debate in Italy [10,11,12,13].

For some people, a mandatory vaccination restricts their freedom of cult and thought.

The experience reported in this issue describes compulsory mass vaccination as the only way to overcome pandemics and protect the most vulnerable subjects.

For this purpose, laws are already in force in Italy aimed at combating the drop in vaccinations, both mandatory and recommended, below 95%. This is in fact the threshold recommended by the World Health Organization to guarantee the so-called “herd immunity”, that indirectly protects even those who, for health reasons, cannot be vaccinated. The Law Decree 73/2017, Urgent provisions on vaccination prevention, amended by the Conversion Law no. 119/2017 signed by Minister Lorenzin, provides the following compulsory and free vaccinations for minors between the ages of

zero and sixteen and for unaccompanied foreign minors: anti-poliomyelitis, anti-diphtheria, anti-tetanus, anti-hepatitis B, anti-pertussis, anti-Haemophilus influenzae type b, anti-measles, anti-rubella, anti-mumps, anti-chicken pox.

The Bourbon's vaccination policy against smallpox was therefore particularly innovative, establishing mandatory and free vaccines, and performing disclosure programs to counteract the false ideas of no-vax people and to persuade someone still uncertain. To date, smallpox is the only infectious disease eradicated worldwide. This result was achieved through the efficacious implementation of mass vaccination in all the countries, which was rigorously carried out between 1958 and 1977, and particularly through a decisive worldwide vaccination campaign conducted by the World Health Organization between 1967 and 1979 [9].

Obviously the current scientific and social context is extremely different from the past and particularly from the period that we considered.

Mandatory COVID-19 vaccination has been extensively discussed and only few countries have opted for compulsory vaccination against COVID-19, while other countries, made it mandatory for specific groups, as health care workers [14,15,16]. Italy and other countries have chosen an intermediate way to manage the pandemic, carrying out a highly recommended vaccination campaign - mandatory only for certain professional categories - and at the same time introducing the obligation of the digital COVID-19 certificate which certifies full vaccination (super Green Pass), the recovery from the infection or the negativity verified through a molecular or antigenic swab (Green Pass).

We are convinced that the history of Medicine is full of examples that help us to better understand some aspects of contemporary health policies. Taking into account from a two-century-old choice, we ask to medical doctors, jurists, politicians, ethics scholars to find answers to the current open questions: how far does the free choice of the individual go when it is not only one's own health at stake but also the one of the entire community? And how far can the state intervene on issues that affect the personal sphere of citizens?

CRediT authorship contribution statement

Maurizio Bifulco: Conceptualization, Investigation, Resources, Writing – original draft, Writing – review & editing, Supervision. **Erika Di Zazzo:** Investigation, Resources, Writing – original draft, Writing – review & editing. **Simona Pisanti:** Investigation, Resources, Writing – original draft, Writing – review & editing. **Mariano Martini:** Investigation, Resources, Writing – original draft, Writing – review & editing. **Davide Orsini:** Conceptualiza-

tion, Investigation, Resources, Writing – original draft, Writing – review & editing.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

References

- [1] WHO. World health statistics 2021: monitoring health for the SDGs, sustainable development goals Available online: <https://apps.who.int/iris/bitstream/handle/10665/342703/9789240027053-eng.pdf?sequence=1&isAllowed=y>.
- [2] Tisci C. Miglietta A, l'apostolo della vaccinazione nel Regno di Napoli": una vita al servizio della pratica vaccinica. *Idomeneo* 2014;17:123–39. <https://doi.org/10.1285/i20380313v17p123>.
- [3] Farooq F, Rathore FA. COVID-19 Vaccination and the Challenge of Infodemic and Disinformation. *J Korean Med Sci* 2021;36(10). <https://doi.org/10.3346/jkms.2021.36.e78>.
- [4] Statistica vaccinica napoletana ossia Prospetto politico della progressione dell'esercizio vaccinico nei domini del Regno delle Due Sicilie al di qua del Faro. Corso di un dodicennio dall'anno 1808 al 1819. Napoli: s.n.t.; 1820.
- [5] Savica V. L'organizzazione sanitaria al tempo delle Due Sicilie (1816–1861). *Quaderni della Accademia Peloritana dei Pericolanti* 2019;2(1):33–40.
- [6] Archivio di Stato di Salerno (ASS) Intendenza Vaccinazione (BB. 1712-1722) Inventario. Int. b. 1679, f.10 23.
- [7] De Simone E. La diffusione dell'inoculazione vaccinica in Terra d'Otranto (1808-1826) Fonti e documenti. *Idomeneo*. 2014;17:75-122.
- [8] Orsini D, Martini M. From inoculation to vaccination: the fight against smallpox in Siena in the 18th and 19th centuries. *Infez Med* 2020;28(4):634–41.
- [9] Canalis P. Il vaiuolo in Italia e la sua profilassi. Relazione al 2° Congresso Nazionale dell'Associazione Italiana per l'Igiene, Venezia. *L'Igiene moderna*. 1923; XVI:275-286.
- [10] Iyengar KP, Singh B, Vaishya R, Jain VK, Ish P. Should COVID-19 vaccination be made mandatory? *Lung India* 2021;38(4):379–81. <https://doi.org/10.4103/lungindia.lungindia.181.21>.
- [11] Graeber D, Schmidt-Petri C, Schröder C. Attitudes on voluntary and mandatory vaccination against COVID-19: Evidence from Germany. *PLoS ONE* 2021;16(5). <https://doi.org/10.1371/journal.pone.0248372>.
- [12] Frielitz FS, Wagner IV, Schewe DM, Bothe K. COVID-19: Wäre eine Impfpflicht rechtlich möglich? [COVID-19: Would compulsory vaccination be legally possible?]. *Dtsch Med Wochenschr* 2021;146(3):206–8. <https://doi.org/10.1055/a-1332-9841>.
- [13] Wang DWL, Moribe G, Arruda ALGM. Is Mandatory Vaccination for COVID-19 Constitutional under Brazilian Law? *Health Hum Rights* 2021;23(1):163–74.
- [14] Hayes L, Pollock AM. Mandatory covid-19 vaccination for care home workers. *BMJ* 2021;374. <https://doi.org/10.1136/bmj.n1684>.
- [15] Osbourne RM, Clark SJ. Should the SARS-CoV-2 vaccine be mandatory for nurses? An ethical debate *Br J Nurs* 2021;30(2):116–21. <https://doi.org/10.12968/bjon.2021.30.2.116>.
- [16] Gasper A. Should SARS-CoV-2 vaccination for all frontline healthcare staff be compulsory? *Br J Nurs* 2021;30(13):828–9. <https://doi.org/10.12968/bjon.2021.30.13.828>.