



# Tuberculosis in Siena: evolution of the disease and its treatment, from the Unification of Italy to the 1930s

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## Keywords

History of tuberculosis • Public health • Tuberculosis • Prophylaxis activities • Carlo Livi • Achille Sclavo

## Summary

*Between the end of the nineteenth century and the first half of the twentieth century, the city of Siena experienced elevated tuberculosis-related morbidity and mortality, to the point that on January 1, 1929 the newspaper La Nazione wrote that “Siena ranks second in the official Tuberculosis (TB) incidence rate”. The author presents statistical data relating to a time span ranging from 1898 to 1935, interpreting them in light of social and sanitary conditions found in the city. The result is an exhaustive picture of the most important actions implemented at city level to prevent tuberculosis and to assist and treat the sick, such as: the creation of seaside hospices conceived by Carlo Livi for children suffering from scrofula,*

*as well as centers committed to the prevention of childhood poverty and malnutrition; the realization of activities in the green areas of the ramparts of the Fortress, upon recommendation by the great hygienist Achille Sclavo; the establishment of a Preventorium on the premises of the Monastery of Santa Maria Maddalena to accommodate children from families that included pulmonary tuberculosis patients, and countless activities carried out by the Anti-TB Dispensary. Of particular interest is the identification of the main cause of high TB incidence in the unhealthy houses located in some areas of Siena’s district, which, in 1930 engendered a lively debate hinging upon the notion of building restoration.*

## Introduction

On March 30, 1856, at the age of 26, Matilde, daughter of the Italian poet and novelist Alessandro Manzoni, died in Siena “of the slow disease”.

The words the poet wrote for the epigraph of his young daughter convey the cruelty of a disease – tuberculosis (TB) – which continued to decimate young lives year after year. And that “slow disease”, recalled and emphasized in Romantic literature, was the primary cause of death in the European continent, affecting first and foremost people who lived under low socio-economic and hygienic standards.

Siena was no exception. Indeed, its “Urban center ranked high among other Italian cities that experienced high rates of TB-related deaths, surpassing the most important populous and industrial centers for the intensity of the epidemic event” [1]. “Bearing in mind the trend of annual quotients during the 1898-1920 period, it seems evident that TB-related mortality in the Municipality of Siena has the character of a persistent endemic phenomenon” [1].

In the second half of the nineteenth century, such data had surprised Carlo Livi, at the time Director of Siena’s San Niccolò Asylum, where scrofulous children received treatment, to the point that he wondered: “Who, amongst you, can tell me why in Siena, a hilly and windy city, with fine, pure and healthy air, that terrible disease called scrofula is rampant, with its sad patient headcount?” [2].

The causes must certainly be sought in the bad environmental conditions of the city’s oldest districts. It should be remembered that immediately after the unification of Italy, a new urbanization impetus led to a significant increase in the number of residents of Siena. In most cases, it was poor families that moved to the city, hoping to find work and, due to their limited financial means settled in unhealthy dwellings located in the city’s poorest districts. In a few years, this situation engendered overcrowding of some urban areas and the rapid spreading of diseases fueled by the poor sanitary conditions within the city walls. In fact, Siena lacked a modern aqueduct and sewer system. Only in 1914, following long and costly works for the construction of a new aqueduct, did water from the Monte Amiata springs could reach Siena. The construction of the sewerage network began after World War I, but conditions remained challenging until the beginning of the 1930s.

It was in this context that the “leprosy of modern times”, tuberculosis, proliferated in a variety of forms.

Three different contemporary studies have left us significant statistics, which provide us with an account of a particularly difficult and serious situation. In the first period under consideration, stretching from the end of the nineteenth century to 1913, tuberculosis mortality in Siena ranged from a maximum of 32.2 deaths per ten thousand inhabitants to a minimum of 22.3, which was recorded precisely in 1913. “In the series of proportional values, the tendency to a kind of epidemic rhythm is manifestly evident: increase is generally followed by decreases, after which a new increase is experienced” [3].

It must be taken into account that the average TB mortality rate in the Kingdom of Italy in 1898 stood at 17.46 deaths per ten thousand inhabitants, and remained unchanged in the following years. These figures concerning Siena were consistent with those of much bigger cities like Bologna (33.6), Genoa (33.2), Rome (30.4), Milan and Naples (29.3) [4].

The National figures decreased in 1912 at 14.9 deaths per ten thousand inhabitants thanks to the diffusion of the radiological diagnostics, the collapse therapy according to Forlanini and to the creation of the first sanatoria. In the same years in Siena – as just mentioned – the figures stood at 22.3 deaths per ten thousand inhabitants.

In the following period, 1914-1920, which is the subject of the second study, tuberculosis mortality in the city of Siena rose significantly during the War years (1915: 24.70 deaths per ten thousand inhabitants; 1916 31.20; 1917: 40.40; 1918: 40), to decrease in 1919 to 29.65 for every ten thousand inhabitants and to 21.62 in 1920.

The raising of the number of infected and death people due to tuberculosis during the last years of World War (1917-1918) – which reached in the city centre of Siena 54 deaths per ten thousand inhabitants – is attributable to the suffering and deprivation caused by the War and were worsened by houses unhealthiness which helps the spread of morbidity.

Regarding the rapid decline in mortality in the two years following the end of World War I, Filippo Neri, Health Officer of the Municipality of Siena and assistant of Achille Sclavo, at the Institute of Hygiene of the University of Siena, wrote: “This decrease certainly cannot depend on the return to normal living conditions, because hardship in this two-year period remained as severe as it had been during the War. An explanation of the rapid decrease of tuberculosis mortality can be surmised only if we keep in mind the 1918-19 flu pandemic. [...] If we admit - as it can be easily assumed - that a large number of deaths from influenza had occurred in tuberculosis patients, whose compromised immune system was easily overtaken by the influenza virus, we have a better understanding of what triggered the rapid decrease in tuberculosis mortality between 1919 and 1920” [5].

In the last period under consideration, from 1921 to 1935, tuberculosis mortality in Siena stabilized in the 1920s, standing at about 22.2 deaths per ten thousand inhabitants, then it progressively declined from 1928, in response to a series of significant preventive actions implemented by the State and the municipal administration: in 1932, the rate was 9.5 and in 1935, 10.4.

However, if we consider the mortality rate due to tuberculosis per one thousand inhabitants, the figures concerning the Municipality of Siena during the decade 1924-1934 were still higher than those concerning the whole Kingdom of Italy (in 1924, 1.80 in Siena, 1.56 in the Kingdom; in 1930, 1.35 in Siena, 1.12 in the Kingdom; in 1934, 1.18 in Siena and 0.69 in the rest of Italy). The data presented above give us a very accurate idea of the gravity of the situation in Siena due to tuberculosis morbidity and mortality.

## Urban renewal as a first step in the fight against tuberculosis

The improvement recorded at the beginning of the 1930s is certainly due to new treatment options delivered at dispensaries, but, above all, to find a solution to the causes that for decades had been deemed to be responsible for a high mortality rate in the center of Siena: population density and unhealthy dwellings. “Mortality is higher where agglomeration is greater. The streets that were especially affected were narrow, thus not exposed to the beneficial influence of sun rays, covered in buildings that did not meet even the most basic sanitary conditions, and were generally overcrowded [...]. Homes, overcrowding and, therefore, the risk of direct contagion accounted for the impressive mortality in a given area rather than another” [6]. This problem has already been reported at the beginning of the century; indeed, in November 1908, a report on social housing found the conditions of working-class districts to be the primary cause of the tuberculosis outbreak [7, 8].

Hence, in 1928, becoming the “need for urban rehabilitation increasingly clear and forceful, without which it is useless to expect efforts against TB to be long-lasting” [1], the project to demolish the Salicotto district, one of the most affected by the disease, began. In this area, in the heart of Siena, as late as the first half of the twentieth century, poor families often cohabited with scrofulous patients in dwellings located below street level, consisting of one or, at most, two dark rooms that received air from the stairs. This condition stood in stark contrast with Achille Sclavo’s recommendations in his Decalogue of Hygiene: “Love sunlight, which gives you everything together with health to your body. Love fresh air and store plenty of it in your home, keeping windows open as long as you can” [9].

The demolition of the houses in the areas which most needed radical sanitary assistance and the building of new houses meeting the modern hygiene criteria, well-furnished and sunny houses, surely represented a key moment for the improvement of population sanitary conditions and particularly in reducing the risk of tuberculosis transmission.

Building rehabilitation in Siena was certainly a fundamental but not sufficient approach – also because it was limited to a small area – for the improvement of the sanitary conditions of the population and, in particular, the reduction of TB risks. The often cited study by Aristide Londini provides significant pre- and post-restoration data relating to the Salicotto district: until 1930 Via Salicotto experienced an average annual TB mortality incidence rate of 33.2, which fell to 16 in 1935, for every ten thousand inhabitants [6].

However, the persisting high incidence eventually pushed the city government and the local politicians to identify as a fundamental objective the “fight against the serious disease that afflicts this land in an impressive way [...] and that kills a large part of our youth” [10].

## Sickly youth

If TB-related mortality in Siena in the first decades of the twentieth century was greater than rates attributable to any other disease, what still surprises for its social implications is the fact that most of those who died of tuberculosis were included in the 16-20 year age group. In the 1898-1913 period, this age group was the most affected by the TB outbreak, with 120.5 deaths per 1000 due to tuberculosis of all ages. The 21-25 and 26-30 year ranges came immediately thereafter, with 125 deaths for each group.

In the period between 1914 and 1920, data are quite similar: the 16-20 year age group recorded 136.04 deaths out of 1000 TB deaths of all ages; with 130.7 deaths for the 21-25 year range group and the 101.43 for the 26-30 year range group.

Finally, in the 1921-1935 period, the age group that recorded most deaths was the 26-30 year range group, with 118.64 deaths, followed by the 21-25 year range group, with 117.87 deaths, every 1000 TB deaths of all ages.

In most cases, women were most affected by the disease. These data dramatically convey the devastating social, economic, and health-related consequences of TB, which was decimating young people precisely at the historical juncture in which they should have given an important contribution to the country's workforce. Furthermore, the extremely high number of women who succumbed to tuberculosis before the age of thirty had a significant impact on reproduction and, by extension, on population growth. In addition, we must factor the challenges that families and society at large had to face during an illness, which was often a long stretch of time.

## The slow start of TB prophylaxis activities

If at the beginning of the twentieth century TB patients were mostly cared for by voluntary associations, whose goal was to alleviate pain for the sick, the resurgence of the disease during the Great War led to the implementation of prevention and care activities on a national scale. At the end of 1916, after fierce discussions in the Parliament, the army was provided with hospital departments for diagnosing the tuberculosis. In 1917, about 20,000 soldiers were recovered in these departments. Incurable soldiers were immediately discharged, those who could be treated were recovered in special sanatoria for at least 4 months, before being subject to a further examination. The call to arms of millions of men increased the chances of contagion in the 18-45 year age group, and, at the same time, the massive recruitment of women, children and the elderly to work in factories in order to fill places left empty by men now engaged at the war front, extended contagion to the entire civilian population.

In 1918, 73,000 people died of tuberculosis in Italy. At the end of World War I, the Government decided that those who had contracted tuberculosis while in the army had to be treated at State expenses and received a grant.

With the massive spread of tuberculosis, also new ways for its containing were explored.

As a result, the Anti-TB Association of Siena was born in the city in 1919. It inherited the legacy of the Standing Committee against Tuberculosis which had been active in Siena since 1898, though its efforts had hardly been paid off. The Association, led by Professor Vittorio Remedi, and with Achille Sclavo as its Vice President, "focused on sad and unhealthy homes, where TB was incubated; joined families in their home environments to identify TB patients, trying to instruct and assist them as much as possible in their own dwellings, all the while seeking to diminish the risk of contagion with the available means" [11].

The following year, as inadequate as its spaces may have been, the Dispensary was operational, becoming the fulcrum of efforts against TB and providing Siena with a center specialized in fighting and containing the disease and its spread.

In 1923, the Law 2889 effectively suppressed provincial committees, establishing anti-TB consortia in their place. In Siena, the Consortium between the Provincial Administration and the Municipalities of the Siena province met for the first time on June 1, 1924. Within a few months, it approved a series of important measures aimed at fighting TB, chief among them, the establishment of 5 dispensaries in the major centers and the hospitalization of tuberculosis patients with partial reimbursement of expenses to the Municipalities. "Professor Achille Sclavo, then Director of the Chair of Hygiene at the University of Siena, joined the Consortium in 1925: thus, propaganda work began in earnest, greatly contributing to TB awareness and the implementation of additional targeted countervailing measures" [11]. Conferences were aimed at all citizens, information brochures were circulated, and an Anti-TB Day was held on July 2, 1925. From a social welfare point of view proper, medical care was provided by the Dispensary.

Finally, in 1928 Siena began witnessing the construction of its Sanatorium [12], which was inaugurated on November 3, 1935, followed by the opening of the new Dispensary, which featured a test laboratory, a radiology room "equipped with a Tetravalvo Rangoni device that could meet the needs of modern radiological diagnostics" and its relative darkroom, a room for TB vaccination, a large terrace for natural heliotherapy and an artificial heliotherapy room "outfitted with five quartz lamps" [11].

## Prevention in children

But actually, the greatest attention in TB prophylaxis was given to children [13]. Among the actions announced by the Consortium in 1924, child prevention played a fundamental role, to be implemented through "the immediate organization of the Grancher approach, which entailed the removal of children from households with TB patients, and their placement elsewhere.

The Consortium also oversaw the construction of a Preventorium designed to accommodate the children temporarily removed from their homes, the creation of a preventive and healing seaside camp and of day camps held in the countryside” [11].

These actions were not easy to implement, so much that in 1929 Giorgio Alberto Chiurco, politician and Director of the Institute of Surgical Pathology of the University of Siena, wrote: “these poor children are held by coughing old men, made to sleep together with TB patients, sit in front of the fireplace alongside sick individuals who, without any medical guidance, are allowed to sow bacilli left and right, infecting infants” [10].

Indeed, as reported by contemporary scientific documents, families of 9-10 people lived in 2-3 dark and damp rooms, with 3-4 children per bed in contact with sick parents and relatives, often at the terminal stage of the disease.

On that same year, the *Podestà* [14] of Siena, Fabio Bargagli Petrucci – buttressed by the positive opinion of Achille Sclavo – oversaw the construction, not without difficulty, of a TB Preventorium on the premises of the monastery of Santa Maria Maddalena. Divided across 3 floors, the facility included male and female dormitories in ventilated and sunny rooms, a kitchen and a refectory and, as suggested by the Health Officer, could host as many as 60 children up to the age of 9 (males) and 12 years (females), who were housed until the danger of infection at their homes was deemed to have disappeared completely.

The facility also included a nursery for infants and a special section for sick children.

Removal from an environment that led to contagion, better nutrition, outdoor living in the sun and pure air were fundamental remedies at a time when no drugs were available to treat TB.

But preventive actions aimed at children actually began much earlier, in the mid-nineteenth century, due to the particular interest of Carlo Livi, who, in 1864 founded the Popular Association for Siena’s Scrofulous Children. At the urging of Giuseppe Barellai [15], his colleague and great friend, Livi was active in the construction of seaside hospices in Viareggio and Porto Santo Stefano, in the 1860s and 1870s, aware that “every year, the sea, beneficial [...], opens its great arms to welcome infirm, meager and hunched children and youngsters partially blinded by scrofula, and sends them back to their homes healthy, vegetative, robust and cheerful” [2].

Livi’s ideas and work were carried out by his colleagues and students, including Paolo Funaioli and Flaminio Tassi, who, through medical and statistical reports, gave us an account of the results on children who “stayed on the beach, which, if not unique, is at minimum the most powerful of the remedies to be leveraged against the terrible disease” [16].

Over the years, other preventive actions were also implemented: starting in 1919, a summer camp was held on the ramparts of the Fortress, welcoming about 100 children, from 3 to 12 years of age, who were placed under the care of health personnel also dur-

ing the year; an outpatient heliotherapy center - with 14 beds - was carved out of the garden of the Santa Maria della Scala Hospital, which operated according to guidelines established by Dr. Auguste Rollier. Therefore, for decades, before antibiotics became available, the sea, “a great drug for scrofulous children” [17], and sun exposure played a fundamental role in the prevention and treatment of tuberculosis. It should be emphasized that no scientific reasons were known at the time about the beneficial exposure to sea and sun.

## Conclusion

Between the second half of the nineteenth century and the first three decades of the twentieth century, tuberculosis, mainly in its pulmonary form and, secondarily, in other forms, was the most pernicious disease in Siena due to its high rate of morbidity and mortality.

Without drugs available to treat TB, whose causes were known, it became necessary to combine efforts to neutralize any situation that could promote TB onset and contagion. The result was an important project that brought together Province, Municipality, University, Hospital, Associations and citizens to prevent and treat, not only medically speaking, but also in a manner that had clear social implications.

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## Conflict of interest statement

The authors declare no conflict of interest.

## Authors' contributions

The Author conceived the study, drafted and revised and approved the manuscript.

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