

# Enrico Pieragnoli and the Prevention of Tuberculosis: Florence 1906

**Authors:** Andrea Alberto Conti, MD, MPH. Donatella Lippi, Mphil, Gian Franco Gensini, MD., Florence.

**Correspondence to:** Andrea Alberto Conti, Don Carlo Gnocchi Foundation, Health Care and Scientific Research Institute, (IRCCS), Via Imprunetana 124, I-50020 Pozzolatico, Florence, ITALY.  
Tel: +39-055-2601256. Fax +39-055-1272. E-mail: [aconti@unifi.it](mailto:aconti@unifi.it)

**KeyWords:** History of Medicine; Tuberculosis; Prevention; Enrico Pieragnoli; Evidence Based Medicine.

## SUMMARY

Tuberculosis (TBC) is today a health priority in Asia, Africa, and South America and a re-emerging social disease in the Western World. While the pharmacological therapy of TBC is nowadays well established, preventive measures are still under-powered and under-estimated. Current failures in the prevention of tuberculosis are even more surprising considering that, already a century ago, a comprehensive preventive of defence against TBC had been designed by clinicians and *ante-litteram* 'health care managers' such as Enrico Pieragnoli.

Pieragnoli was an Italian physician who lived in Florence between the XIX and XX century, and who, after many years of accurate planning, succeeded in 1906 in opening the first Italian tuberculosis preventive centre. Pieragnoli considered it his mission to 'fight' against TBC, a public enemy that was to be defeated using the weapons of global prevention; Pieragnoli had crystal clear concepts of prevention, of the predisposing factors to the disease, and of the need for aggressive treatment. He established his preventive institute with two main aims: the modification of the individual substratum in which the germs grew and the removal of contagion.

The prophylactic and diagnostic accuracy of his preventive institute are shown in a number of clinical documents containing objective body measurements (height, weight, thoracic circumference), quantitative clinical comparisons (intra- and inter-subjects) and field epidemiology. We may therefore conclude that the cornerstone of evidence-based prevention of tuberculosis was present in Italy almost a century ago.

## RÉSUMÉ

La tuberculose (TBC) est, de nos jours, prioritaire en ce qui concerne la santé des habitants d'Asie, d'Afrique et d'Amérique du Sud ; elle constitue en plus une maladie sociale renaissante dans le monde occidental. Tandis que la thérapie pharmacologique de la TBC est fortement établie, les mesures préventives restent excessivement faibles et sous-estimées. Les échecs actuels dans la prévention de la tuberculose sont autant plus surprenants étant donné que, il y a déjà un siècle, il existait une préventologie étendue de défense contre la TBC, conçue par des cliniciens et des 'directeurs de soins médicaux', pour ainsi dire, comme Enrico Pieragnoli.

Pieragnoli était un médecin italien qui habitait en Florence entre le XIXème et le XXème siècle. A la suite de plusieurs années de planification détaillée, c'était lui qui a réussi à ouvrir en 1906 le premier centre pour la prévention de la tuberculose en Italie. Pieragnoli considérait que c'était sa mission de lutter contre la TBC, ennemi public à vaincre en utilisant tout l'arsenal de la prévention globale. Pieragnoli possédait des idées bien claires concernant la prévention, les facteurs prédisposant de la maladie et la nécessité de thérapie agressive. Il a fondé son établissement préventif ayant deux buts : la modification du substratum individuel dans lequel poussaient les microbes et la suppression de la contagion.

L'exactitude prophylactique et diagnostique de cet établissement préventif est attestée dans certains documents cliniques qui contiennent des mesures corporelles objectives (taille, poids, circonférence thoracique), des comparaisons cliniques quantitatives (intra- et inter sujets) et de l'épidémiologie dans la domaine. C'est à conclure donc que la base de la prévention de la tuberculose fondée sur les preuves existait déjà en Italie il y a presque un siècle.

## THE CONTEXT

Tuberculosis (TBC), also called 'the White Plague', has been the single most important cause of death in the developed world, and the scourge of early industrial society. Medical debate focused on some main questions - whether it was a hereditary disease, or a self-inflicted condition which poor people brought on themselves by

their squalid habits, or if it was the consequence of urban life and environment. The cause remained unknown until the German bacteriologist Robert Koch identified the tubercle bacillus on 24th March, 1882.

Sanatoria for sufferers of tuberculosis had already been developed before the recognition of the causative agent, as an extension of hygiene; they then spread all

over Europe and North America. Before the introduction of streptomycin and of BCG vaccine in the late 1940s, sanatoria remained the only 'curative' strategy for consumptives.

The concept of prevention was therefore of central importance in the struggle against TBC.

### ENRICO PIERAGNOLI

Enrico Pieragnoli was born in San Miniato in Italy (Pisa) in 1857 and died in Florence in 1943. His first contribution to the study of TBC was in 1886, when he presented, before the Florence Society of Hygiene, a study on the contagion and prophylaxis of pulmonary TBC (1), just four years after Koch's discovery of *Mycobacterium tuberculosis*. Between 1886 and his death, Pieragnoli devoted his activity to the prevention of TBC. He was health director of the Demidoff Institute from 1896 to 1943, where he developed practices of hygiene and preventive medicine (2,3), and was later a member of the Preventive Antitubercular Union from 1924. In 1886 he formulated the idea of a sanatorium for children prone to TBC, in order to prevent the disease developing in adults. In 1900 a Promoting Committee for the foundation of a permanent sanatorium was established in Florence. Pieragnoli became the secretary of this Committee, which also included two other famous Florentine physicians, Pietro Grocco and Giuseppe Mya (4). The first was director of the Medical Clinic and a great expert in pulmonary diseases who founded in 1899 the Antirabic Institute, four years after Pasteur's discovery of the so-called 'virus fisso'. Giuseppe Mya was one of the pioneers of Italian paediatrics.

Florence was in the van of health care, drawing public attention to the adoption of precautionary measures. The diffusion of TBC in Florence, as in other cities involved in the process of urbanisation and industrialisation, constituted a sort of pathological geography. The sanitary conditions of houses and other living quarters and the density of population in different areas of the town showed a varying distribution of TBC and a selective mortality. TBC preferred the thickly populated neighbourhood, raging in the poorest quarters of the town, where numerous families lived in unhealthy conditions.

Pieragnoli was aware of the social character of the disease, and directed his efforts towards the defence of those children who could escape it, if removed from their environment (5). The most innovative principle of Pieragnoli's activity was therefore the development of the prophylactic concept of hospital care. Before his

work, sanatoria were considered the only way to treat consumptives; only people who suffered from active tuberculosis were admitted to them. The fight against TBC had been a fight against the consumptive, who was isolated, lost his freedom, and was condemned to a period as a recluse. Pieragnoli succeeded in demonstrating TBC as a social disease, and his concept of prevention represents the very innovative aspect of his approach.

### THE 'PREVENTORIO':

The Promoting Committee, consulted about the matter of setting up the prophylactic hospital, outlined the general principles inspiring its decisions (today we would call them guidelines).

1. The Institute was to be sited on a hill, in favourable climatic conditions;
2. It was to develop a defensive action against family (familiar) contagion with a highly prophylactic action against latent tuberculous forms;
3. The modification in the living conditions of children were expected to continue even after active immunisation was widespread;
4. An open-air school was necessary in order to take advantage of the curative action of air;
5. An agricultural colony was to provide occupation for the patients;
6. A seaside resort and a mountain health resort were expected to complete the programme;
7. After discharge the children had to be supervised, in order to control their health conditions and provide them later with suitable work.

The establishment of the 'Preventorio' was preceded by the foundation of the first mountain health resort on the Pistoiese Appennines (Tuscany mountains), which went on working for many years. On 24th June, the Day of the Patron Saint of Florence, St John the Evangelist, the Preventive Sanatorium was opened in 1906. It was situated in Villa Ulivini near Vincigliata on a splendid green hill behind Fiesole. The villa was provided by the munificence of Miss Turton and Miss Bryant, two well-deserving English ladies. Many institutions contributed to the realisation of this project, to whom H.M. Queen Elena gave her support and her name (6.7). This hospital, the first created to help children threatened by TBC, was able to exploit its suitable position with a building structure which was adapted to the necessities of the children through the construction of terraces and play-spaces.

The therapeutic action included a food-cure, based on a rich diet programme, an open-air cure and sunbathing. Every effort was made to spare the strength of the children, who had to perform respiratory exercises to strengthen their lungs. Gardening, open air games, and hydrotherapy were integrated into a programme of hygiene and moral education.

On admission each patient was screened for past clinical history and examined to record physical findings. The relationships as well as the family living conditions and type of home were evaluated, and a complete clinical record made. Physical examination was divided into general and thoracic. In the first part of the examination, the nutrition state, the muscular status, and lymph node findings represented the cornerstones. The thoracic examination, apart from an accurate qualitative description, included quantitative parameters such as the measurement of the chest circumference and chest range of movement. These quantitative baseline parameters had particular relevance as they were checked daily during the whole period of hospitalisation, thus permitting an 'evidence-based diachronic analysis'. Together with thoracic measurements, height and weight were recorded daily for every patient. The availability of these anthropomorphic parameters made quantitative clinical comparisons possible, both for individual patients and for the total number. Blood analyses and pulmonary function studies completed the full clinical assessment made by Pieragnoli, constituting a real health achievement over the period it was performed. This quantitative evaluation also allowed Pieragnoli to evaluate accurately the importance of symptoms such as coughs and sneezes that had been previously overestimated. The nosography of pulmonary diseases adopted and remodelled in the Preventive Sanatorium allowed an extensive differential diagnosis to be made with respect to a number of forms of pneumonia.

The preventive and therapeutic approaches of Pieragnoli could not be based on specific drugs as we know them today, but on the removal of contagion and on the modification of the individual substratum in which germs grew. The counselling by Pieragnoli with regard to exposure to open air and sun baths was useful in general terms. The incidence of rickets was quite high in the poorest strata of the population at the beginning of the XX century, and the interventions suggested by the Institute were no doubt useful in 'treating' vitamin D deficiency. In the same way, a correct dietetic regime, an integral part of the preventive programme improved the health of the hospitalised children. Open air environment and respiratory training and hydrotherapy completed the circle of the preventive programme of Pieragnoli's centre.

## CONCLUSIONS

The fight against TB in terms of prevention still today represents a major challenge for national health systems. This appears particularly true considering that mass migrations increase world-wide and that the poorest still remain those at the highest risk.

While the pharmacological therapy of TBC is nowadays well established preventive measures are still under-powered (an effective vaccine is not yet available), and under-estimated. The role of diet and style of life habits is not yet fully taken into account in many health programmes (8). This is even more astonishing if we reflect on the fact that, already a century ago a comprehensive prevention of TBC was programmed by such an early 'health care manager' as Enrico Pieragnoli.

## Acknowledgments

The authors would like to thank Professor Luisa Conti Camaiora, BA, MPhil, for her correction of the English, and Professor Enrico Pieragnoli, grandson and namesake of the physician we have written of in this paper, for useful information.

## Bibliography

1. E.Pieragnoli, *Contagio e profilassi della tubercolosi*, Firenze, 1887.
2. After his death, the Preventive Sanatorium was directed by Dr Luigi Gajo till 1965 when the structure was 'symbolically' rented by the Students' Benevolent Fund of the town. From 1977 the Town Council used the structure for foreign students, but in 1994 it was bought by the Archbishopric. With this money, the Enrico Pieragnoli Welfare Institution was established in order to help young people with social problems.
3. E.Pieragnoli. *Relazione e statistica sanitaria del Pio Istituto Demidoff*, Firenze, 1980.
4. E.Pieragnoli, *Programma e appello alia cittadinanza fiorentina per la istuzione di un Sanatorio per bambini predisposti alia tubercolosi*, Firenze 1900.
5. E.Piereagnoli I sanatori per I predisposti alia tubercolosi. Firenze, 1904. Idem *Cura preventiva della tubercolosi*, Firenze, 1906.
6. E.Pieragnoli, *Storia, scopo cure e ordinamenti del Sanatorio R.Elena e della Colonia Vittoria*, Firenze, 1913.
7. L.Gajo, *Il sanatorio preventivo per i bambini predisposti alia tubercolosi* Firenze, 1946.
8. *New Scientist*, 7 July 2001.

**Biographies**

Andrea Alberto Conti, MD, MPH, is a clinical researcher in the Department of Internal Medicine and Cardiology, University of Florence, and an epidemiologist in the Don Gnocchi Foundation, Florence. In History of Medicine his research field is in the history of clinical methodology, evidence based medicine, and cardiovascular medicine.

Donatella Lippi, MPhil, is a member of the International Society for the History of Medicine, Associate Professor in the History of Medicine in the Department of Anatomy Histology and Legal Medicine, University of Florence. Her research work is the history of ancient medicine and the history of nineteenth century medicine with particular attention to the problems of medical education.

Gian Franco Gensini MD is Full Professor of Internal Medicine and Cardiology, Director of the Italian Centre for Evidence Based Medicine, and Dean of the Florence Medical.