

# Piero Sepulcri (1899-1980) and malaria eradication in Veneto

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## SUMMARY

Piero Sepulcri may be considered the antimalaria pioneer in the Italian region of Veneto during the 20th century. Through his activity with the Regional Antimalarial Institute he made a major contribution to one of the most important successes of medicine in the 20th century: malaria eradication in Italy. His writings on the activity of the Antimalarial Institute display the phases of eradication. In the first period antimalarial drugs were used to cure infected patients and as prophylaxis against infection. In the second

period, eradication of vectors permitted the lack of transmission and consequent eradication of malarial disease. The history of malaria eradication in Italy is of the utmost importance because it established a series of steps to be taken against any transmittable disease that could return and spread once again in Italy or elsewhere.

*Keywords:* malaria, anopheles, prophylaxis, treatment, history, Veneto.

## PIERO SEPULCRI: A LIFE IN FEW WORDS

Piero Sepulcri was born on November 28<sup>th</sup>, 1899. While studying medicine at the University of Padua he became resident at the institute of a Hygiene from 1923 until he graduated. At the same time, he also worked at the hospital of San Donà di Piave where many patients affected by malaria were admitted. In the 1924 and 1925 he spent the summer serving at the Termine's ambulance, between the rivers Piave and Tagliamento. Between 1926 and 1928, he was employed in ambulances for malaria fight in the roman countryside while frequenting the pathology institute of the university of Rome. In 1927 he was hired as a malaria expert at the Venetian Antimalarial Institute (VAI), covering the same role at the administration of Venice province. In 1933 he became lecturer at the Parasitology Institute of Rome. In the same year he contributed with a chapter to the Italian document of hygiene directed by Casagrandi. He also taught the course of par-

asitology at the school of hygiene, university of Padua, until 1940. Still in 1933 he was assigned as technical director to the Venetian Antimalarial Institute, and he kept this role until 1967, when the institute was closed. Only between 1940 and 1943 he had to leave his job as he was called to arms for the second world war. He served as a medical captain and was sent to direct a field hospital in Albania. In may 1941 he was sent to the stewardship of 11 corps, for organizing the defense of the Italian army in the Greek territory. In December 1942 he achieved the grade of major for distinguished service. He was dismissed in 1943. From 1938 to 1940 he had to take care of the ambulance of malariotherapy at the hospital of San Clemente in Venice. The centre gave malariotherapy to psychiatric patients at least until 1944 and published many research articles. Sepulcri died the 18th of November 1980 in San Donà di Piave [1].

## THE WORK OF SEPULCRI AT THE VAI AFTER THE GREAT WAR

The VAI was instituted as moral authority by the Royal Decree of 18 January 1923 (1, 2). In 1927 its composition was defined, and in that year Sepul-

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cri was hired as the malaria expert of the institute. In 1929 in Portogruaro took place the regional antimalarial convention that analyzed all the prevention methods available, which were listed as following:

- A quinine prophylaxis 2 times a week for healthy people according to Ross
- Roentgen therapy of chronic malaria patients (irradiation of the spleen to stimulate immunity)
- Bio warfare against the larvae by using gambusia and other local fishes.
- War to the larvae by using chemical substances ("Paris green")
- Collective mechanical defense (nets over windows of houses)
- Use of personal devices to fight the vectors (bed nets)
- Defence against zoophylic strains by animal housing
- Defence against the flying insect (petrol, etc.)
- Propaganda

The institute wanted to take direct control over the following functions

- Didactic and propaganda
- Diagnosis treatment and prophylaxis
- Collateral services (kindergartens summer camps and residences)
- Fight against the vector (use of antilarval pest control and small reclamation)

Of special interest was the presence in the territory of antimalarial ambulances directed from remote by the institute. Such ambulances were assigned the diagnosis and treatment of the malaric patient. The staff included a nurse and a microscopy technician. The treatment of the malaria attack was quinine, 1.6 g/d for 20 days, or quina-crine, 300 mg/d for 20 days. "Summer patients" in the winter underwent a special treatment for 40 days. Treatments with arsenic and iron were later added. "Terzana maligna" was treated with gametocytocides, for example plasmoquine. Cases of severe malaria were treated with intramuscular quinine or intravenous quinine associated with analeptics. In patients with haemoglobinuria the quinine was substituted with cinchonina. Sepulcri observed that in Veneto region haemoglobinuria was a symptom only in chronic patients.

The method of the institute prescribed that the chronic patients would have been admitted to

the "Ospedale al Mare" in Venice's Lido, while kindergarden in the mountains admitted convalescent children. Sepulcri noted that from 1932 the doctors of the institute decided to personally screen the children to send to these kindergartens, most likely to prevent easy vacations.

The work of the Institute in the time interval between 1929 and 1939 was to apply the measures established by the Portogruaro convention.

The results were brilliant: in the final statistics analysis, malaria was eradicated in the Vicenza province, and survived only in one village (Roncade) in the Treviso province.

The Po delta resulted still highly endemic, with improvement in the remaining provinces.

Sepulcri wrote that in 1934 427 infected people returned from working in the land reclamation of the Agro Pontino, and other 427 in 1938 from Agro Pontino, Sardinia and Italian colonies in Eastern Africa.

#### ■ MALARIA IN THE VENETO REGION DURING THE SECOND WORLD WAR

Due to the interruption of the land reclamation works and of the activity in the Institute, an increase of number of cases of malaria was recorded in the Venezia, Rovigo e Udine provinces [2].

The worsening was not relevant in Verona, Treviso, Trieste and Istria provinces.

From the vector side, there was an increase of the presence of *Anopheles elutus* "brought from the salty waste water coming from the metan wells". During the war, 2600 people underwent the malaria prophylaxis given from the Institute. Beside quinine, acridine derivatives were used thus obtaining a reduction of the relapses (11% vs 35% with quinine only). In 1945, few months after the end of the war, the Institute registered the return to the previous malaria epidemic situation, except for the Rovigo province were still 7000 malaria cases were recorded. Notably, although Sepulcri reported an optimistic situation, the prevalence of malaria in the Venice area was still 12.3%.

#### ■ BETWEEN 1946 TO 1953

This period was crucial for the ultimate eradication of the malaria endemic in Italy.

After the war, the Institute provided a new map of the malaria vectors. The result was that *Anopheles elutus* was the main vector of malaria in the Veneto Region, while *Anopheles maculipennis labranchiae* was scarcely present (3).

In 1946, the DDT power started to be employed in 5% solution and sprayed with doses of 1,5g/mq. 15.6 millions of kg of DDT were sprayed on a surface of 11 million of meter square. The treatment was performed from May to July. In October all the anopheles' species totally disappeared. The reported malaria cases reduced of 50% compared with the previous year. The quinine prophylaxis was stopped. From 1945 to 1948 the Institute experimented the Paludrine as antimalarial, finding an either equal or increased efficacy of the quinine. In 1950 the activity of the institute was reduced solely to DDT insect destruction, from 1951 the staff spraying DDT moved by bike. In 1952 only 7 cases of malaria were reported in the Veneto region, one of them from transfusion. The parasitic and splenic index dropped to zero.

The DDT campaign was continued during the '50s but other insecticide was experimented.

## ■ CONCLUSIONS

Doctor Piero Sepulcri and "his" antimalarial institute activity represents a relevant contribution to

one of the most important successes of the medicine in the XX century: the malaria eradication in Italy [3-5].

Sepulcri conducted the battle against malaria with a sort of "religious zeal", as other malaria specialists from that century. He worked in the first line of the prevention field and was considered a reference figure by hundreds of health officers and patients.

His writings on the activity of the Antimalarial institute are of particular interest for historical relevance and because they set a stepping stone for careful acting against any transmittable disease that may come back and spread again in our country or elsewhere.

## Conflict of interest

None

## ■ REFERENCES

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