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# ENDEMIC SYPHILIS IN BOSNIA *

## Clinical and Epidemiological Observations on a Successful Mass-Treatment Campaign

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## FOREWORD

Success in the prevention and control of any disease depends on a knowledge of its natural history. It is not sufficient to study the course of the disease and its behaviour in the individual; the investigations must be carried out among the affected population as a whole, and particularly into their environment. The characteristics, habits, and customs of man in his physical, mental, social, and economic surroundings must be considered if the underlying causes of mass disease are to be understood. With communicable diseases, the relationship between host and environment, as well as between parasite and host, must be defined so that epidemiology becomes a broad method by which the natural history of the disease is elucidated, leading to a better understanding of the nature, sources, means of spread, and eventual control of the disease.

The present paper is an attempt to study the natural history of syphilis in Bosnia in this broader sense. The Bosnia syphilis is a treponemal disease, usually non-venereally acquired in childhood, which has been known to be endemic in the region for many centuries as a result of the invasion of Europe in the 17th and 18th centuries by the Ottoman armies. Many pockets of land populated by people of Turkish origin were left behind in eastern Europe, in which the disease has remained very prevalent until recent times. Bosnia is the largest of those areas where the social and economic conditions, associated with very low standards of hygiene and of living in general, have for centuries maintained an environment favourable to repeated exposures to and the transmission of *Treponema pallidum* by direct and indirect contact—domestic utensils, etc. This epidemiological setting has persisted until the present day and is similar to that which existed in Cromwellian England when the " Sibbens " was a widespread non-venereally acquired syphilitic infection in children. The same applies to the "Radesyge" in 16th-century Norway and to other non-venereal treponemal infections in children found in different countries of Europe in the 18th and 19th centuries.

The natural course of syphilis acquired in childhood, including its epidemiological, clinical, laboratory, and other aspects, has not been adequately described in existing literature. The present study represents an important contribution to the limited knowledge on the subject. The environmental factors and their influence on the perpetuation of the infection as an endemic disease, the course of the disease over decades, and present control efforts are discussed; facts about this " endemic " type of syphilis are appraised;

* This paper, the first of a series of studies on treponemal diseases, will also be published in the Monograph Series of the World Health Organization.—ED.

and original theories and new considerations are advanced explaining its behaviour in a primitive environment.

This paper, therefore, is not only of interest from the point of view of epidemiology and the successful control of a non-venereal syphilis problem in rural areas, and because it fills important gaps in medical knowledge, but should also be of considerable value in the control of other treponematoses, such as bejel, " njovera ", and particularly yaws, all of which have epidemiological features similar to those of endemic syphilis and in which only the resulting clinical syndromes are different. Furthermore, this study has contributed to the drawing-up of plans for both special and general public-health measures in the areas under consideration. A favus-control programme is already in operation, and it is presumed that the relationship already established with the people and the new record system will contribute to the improvement of local health measures.

Since 1948, the Yugoslav health administration has developed a nationwide syphilis-control programme as part of its general health activities. In Bosnia, a special effort has been made to control endemic syphilis as part of the general programme for social and economic development. The World Health Organization (WHO) and the United Nations International Children's Emergency Fund (UNICEF) have participated in the programme at the request of the Yugoslav Government. International interest in the endemic syphilis in Bosnia, however, is not of recent date. In 1933-6, the Rockefeller Foundation supported national field studies into the nature of the disease with a view to defining the differences that were believed to exist between the endemic type of syphilis found in Bosnia and the sporadic venereal syphilis found in other parts of the world. With the increase of co-operation among nations in matters of health after the second World War, and, on the technical side, after the introduction of repository penicillin preparations, it became possible to approach this problem on a large scale and in a more practical manner. A wide case-finding and treatment programme has been in operation in Bosnia since 1948, and it has attracted particular international attention as one of the first systematic programmes in the world aimed at eliminating an endemic infectious disease through mass treatment.

Preliminary discussions between the Yugoslav health administration and WHO, which took place in 1947 and were followed by a field study by Dr. T. Guthe, of WHO, and Dr. D. Borenstein, of UNICEF, led to the formulation of plans for the current programme against endemic syphilis in Bosnia as part of the nationwide syphilis-control programme. Various supplies and equipment were furnished by UNICEF, and several WHO expert consultants and advisers have subsequently studied the Bosnian programme in its different phases of development, among them Dr. Evan W. Thomas, Professor of Clinical Medicine, New York University, and Dr. E. Gurney Clark, Professor of Epidemiology, Columbia University, in 1950 and 1951. The planning, implementation, and follow-up of the programme have been the responsibility of the Yugoslav health administration and of the Field Director, Dr. E. I. Grin, Director of Health, Sarajevo, the author of the present paper.

At the request of the author, Dr. E. G. Clark undertook to comment on and discuss various aspects of the mass campaign. His views were embodied in a paper presented to the fourth session of the WHO Expert Committee on Venereal Infections and Treponematoses, which met in London from 28 July to 2 August 1952. This paper will be included in the report of the Expert Committee, which will be published in the *World Health Organization: Technical Report Series*, subject to approval by the Executive Board.

## INTRODUCTORY REMARKS ON BOSNIA-HERZEGOVINA

The People's Republic of Bosnia and Herzegovina occupies a central geographical position among the Federal Republics of Yugoslavia. It is the third largest, with an area of 51,567 km², or 20.7% of the Yugoslav territory. It consists of two geographical units, Bosnia occupying the northern and central part and Herzegovina the southern. It is predominantly mountainous, 66% of its territory consisting of mountains and highlands with a total wooded area of 2,134,196 hectares.

At the frontier of Bosnia and Herzegovina the temperate continental climate meets the Mediterranean climate. Central and eastern Bosnia have a typical Central European climate with cold, snowy winters and moderately warm summers. Favourable natural conditions for growing cereals and fruit trees, particularly plum trees, ample resources in minerals and ores, extensive forests, and rich reserves of water-power give an excellent basis for the rapidly developing industrialization of the country.

On account of the favourable natural conditions, the present territory of Bosnia-Herzegovina was settled as long ago as the remotest prehistoric times, the chief representatives of its ancient civilization being the Illyrians. They were subjugated at the beginning of the 1st century A.D. by the Romans, who ruled these regions for more than four centuries. After the splitting-up of the Roman Empire into the Eastern and Western Empires, the area occupied became the theatre of conflicts between Eastern and Western civilization. The first Slavs started to invade Bosnia at the beginning of the 7th century, and in the valley of the river Bosna they formed the core of a mediaeval State.

During the course of history nearly all its present provinces became attached to Bosnia, and its boundaries corresponded more or less to the present frontiers. Meanwhile, the State was not particularly strongly organized, and Bosnia came under Turkish rule at the beginning of the 15th century, without much resistance. Thus, it came to occupy a strategic position between East and West.

Turkish rule in Bosnia-Herzegovina made a deep and lasting impression on social, economic, and cultural life, and the influence of Islamic civilization became predominant. The Mohammedanized population, though it had broken off almost all contact with its national traditions, still retained the language and some customs as its specific national mark. Meanwhile, the rural districts experienced cultural and economic stagnation, and the standard of life remained extremely primitive.

Turkish rule lasted until 1878, when the Congress of Berlin gave Austria-Hungary a mandate to enter Bosnia. The Austrian occupation of Bosnia-Herzegovina, with its semi-colonial methods of administration, provoked a strong national movement resulting in the assassination at Sarajevo in 1914 of the heir to the Austrian throne, the Archduke Ferdinand.

In 1918, after the first World War, the newly created State of Serbs, Croats, and Slovenes brought about no essential social or economic changes in Bosnia-Herzegovina, and the much-hoped-for cultural and industrial development made but very slow progress. Bosnia-Herzegovina remained, in fact, only a sphere of interest in a common State, while religious and national differences became more and more acute.

At the beginning of the second World War, when the occupation was followed in this part of Europe as in others by a struggle for national liberation, which started on 27 July 1941, the crisis threatening social, national, and political disintegration and economic stagnation was surmounted. By paying a huge toll in human life (the war claimed 700,000 victims in Bosnia-Herzegovina alone), in suffering, and in material losses, the Federal People's Republic of Yugoslavia was created. The People's Republic of Bosnia and Herzegovina is recognized under the Yugoslav Constitution as a member of the Federal Republic with equal rights.

The low cultural standard prevalent in Bosnia-Herzegovina during its historical evolution is best illustrated by the high illiteracy-rate. The Austro-Hungarian occupation found a population more than 95% illiterate, but compulsory primary-school education was introduced only in 1911. Actually, not more than about 15% of school-age children went to primary schools, and Moslem girls did not go to school at all. Owing to these facts, there was no real progress in the cultural life of the population.

After the first World War, the population of Bosnia-Herzegovina was still about 87% illiterate; among the Moslem women, who had almost no rights and who lived in complete subjection to the men, only 1 in 1,000 was literate. As late as 1939, 56.4% of the men and 87.6% of the women in Bosnia-Herzegovina were still illiterate. After the liberation, rapid progress took place, and between then and the end of the scholastic year 1949-50, about 600,000 persons had learned to read and write, while the number of primary schools had increased from 1,043 to 1,847.

The population of the area is 2,565,277 (1,237,381 male and 1,327,896 female), or 16.3% of the total population of Yugoslavia. The annual population increase is 2.27%, the highest rate among the Yugoslav Republics. The average population-density increased in Bosnia-Herzegovina from 45 per $km^2$ in 1931 to 49.9 in 1948. The population is denser in the north, where cereals grow well, and is less dense in eastern and central Bosnia.

Ethnically, the population of Bosnia-Herzegovina is almost exclusively Slav, being composed of Serbs and Croats. Geographically, these two groups are very intermingled, and it is impossible to draw ethnical frontiers. The problem represented by the Moslem population is being solved by encouraging their cultural, educational, and social development in order to bring them more speedily to a stage where they will realize that they belong to either the Serbian or the Croatian ethnical group.

According to the census of 15 March 1948, the most important social groups were as follows : peasants, 1,966,406; industrial workers, 291,408; civil servants, 185,525; craftsmen, 31,261; and tradesmen, 12,913. In the present period of social and economic reorganization of the industrial structure, a continuous change is taking place in the social composition of the population, which is increasing rapidly in towns and industrial centres. The population of Sarajevo, for instance, increased by 57.6% between the liberation and 1948.

There are no big cities in the People's Republic of Bosnia and Herzegovina; but, as in other Balkan countries, there are numerous small towns and villages. Sarajevo is the industrial, political, cultural, and communications centre of the Republic. Its cultural importance has increased considerably since the foundation of the University there in 1949.

## ORIGIN AND EXTENT OF ENDEMIC SYPHILIS

No reliable data are available on the origin of syphilis in Bosnia. Isolated cases are described in historical documents as early as the beginning of the 16th century, at a time when pandemic syphilis raged in Europe. The disease is said to have been introduced from the East by the Ottoman armies which crossed Bosnia on several occasions, setting up military quarters along the highways and in frontier towns. However, the possibility that the West also contributed to its spread cannot be excluded.

There are also descriptions of the appearance of syphilis in other areas of present-day Yugoslavia at about the same time as it was first mentioned in Bosnia : in Dalmatia, where it was known as " mal di Breno "; in Serbia, where it was called " frenga "; and on the Croatian littoral. The disease was then called " Morbus Skerljevo " [5] (after the village of Skrljevo) and spread widely during the French occupation of 1809, although the inhabitants hold to the idea that syphilis was introduced by seamen who had taken part in the Turkish war during the reign of Emperor Joseph I (1781). It is also possible that some syphilis was introduced into eastern Bosnia by Turkish immigrants from Serbia during the first half of the 19th century.

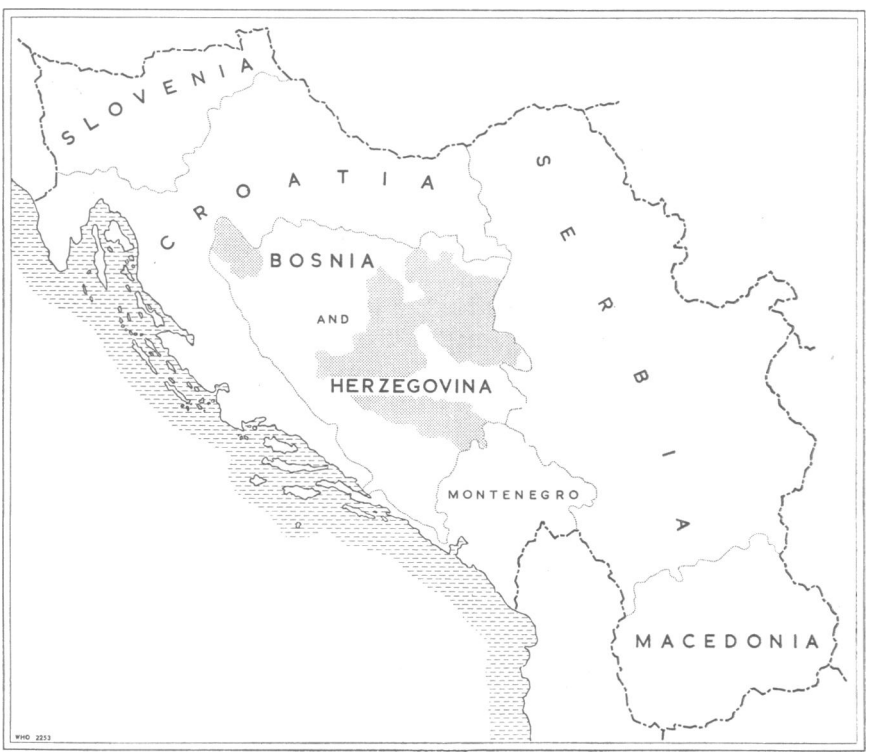
Fra Stipan Kristicević (*Libellus medicinalis*) describes syphilis in Bosnia in 1834, while a later source, namely, Fra Frane Jukić,[41] states that the disease appeared in Bosnia at the end of the 18th century. It remains a fact, however, that the disease spread endemically and epidemically, chiefly among the Moslem population, during Mehmed Pasha's military campaign in Bosnia in 1832, and later with the arrival of Omer Pasha. It has remained a problem of considerable magnitude up to the present day.

The above data indicate that it is highly improbable that syphilis originated in Bosnia from any single source, or that it was brought in

with any single historical event. It is much more likely that the disease was introduced from different countries and at different periods of time, the Ottoman troops playing the major role in its spread. This is given some support by the absence of close contact with the West at that time, whereas close connexions were maintained with the East, with Turkey in particular. Syphilis is, in fact, much more widespread in the eastern than in the western part of Bosnia. There is no information to show the extent of the problem in Bosnia under Turkish domination, but it is highly unlikely that the disease could have acquired ascendancy over an entire province at any one moment.

By the end of the 19th century, when Austria had occupied Bosnia and Herzegovina, syphilis was already widespread. It was most common in Cazin, and in central and eastern Bosnia, while the least affected area was Herzegovina. Records [40] for the period from 1905 to 1911 show that, in investigations carried out in 37 districts, 41,398 clinical cases of syphilis were found, the infection-rate among the population examined being 8.3%. Clinical signs of early syphilis were found in 30,933 persons,

**FIG 1. PREVALENCE OF ENDEMIC SYPHILIS IN BOSNIA AND HERZEGOVINA, 1951**



while 10,463 showed tertiary lesions. The actual number of infected persons was no doubt larger since the investigations were incomplete; moreover, latent syphilis was not diagnosed as serological tests were not carried out at that time.

After the collapse of the Austro-Hungarian Empire, an attempt was made to organize a syphilis-control programme in Bosnia and Herzegovina, the main part of which was carried out between 1926 and 1933. During this period serological examinations were performed, and many cases of latent syphilis were diagnosed. Specifically, 57,965 cases of syphilis were found, 17,746 in the early stages, 6,943 in the tertiary stage, and 33,276 in the latent stage. The infection-rate among the population examined was 11.8%.

As there was no uniformity in the organization of the programme, in the diagnostic procedures used, or in the control of infective cases by follow-up or analysis of the data collected, the findings were not sufficiently reliable to form a basis for valid conclusions on the true nature and extent of the problem at the time or on the effect of the programme. Nevertheless, the observations made give valuable information on the geographical extent of the disease and confirm that syphilis was endemic, and sometimes epidemic, in many parts of Bosnia.

Finally, in 1941, at the beginning of the German occupation, plans were drawn up and an attempt was made to launch a general campaign to eliminate endemic syphilis as a rural health problem in the area. Little progress was made, however, and the undertaking was soon abandoned. The situation was aggravated during the war by the migration of large numbers of refugees and by a further deterioration in living conditions and sanitation; this gave rise to a number of new endemic foci in towns and rural areas.

Fig. 1 shows the areas of Bosnia and Herzegovina where endemic syphilis was prevalent in 1951.

The main reasons for the failure of previous efforts [30] to control syphilis in Bosnia are considered to be the following :

1. Action against the disease was not undertaken simultaneously throughout all the infected areas; and, in those areas where control efforts were made, there were frequently long interruptions in the work.

2. No systematic examination of the entire infected region was attempted, such work being restricted to small areas only; a large number of cases were therefore not discovered, and numerous small and large foci of infection remained.

3. Emphasis was placed on the clinical and pathological, rather than on the epidemiological, aspects of the disease.

4. Modern antibiotics were not available; and only a small number of infectious cases completed treatment with the classical chemotherapy

methods, which were not suitable for mass work in isolated, and sometimes almost inaccessible, rural areas.

5. Low social and economic standards, primitive sanitation, and poor living conditions, remaining almost unchanged, created a favourable epidemiological environment for the recurrence of cases and for the perpetuation of the disease.

**FIG. 2. INCIDENCE OF ENDEMIC SYPHILIS IN NORTH-EASTERN BOSNIA, 1906-11 (BASED ON CLINICAL SYMPTOMS ONLY)**