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**Title page**

**Title:** Hookworm in Rural Spain, 1910-1960: Shifting Paradigms around the Civil War

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## ABSTRACT

In Spain, hookworm infection was first recognised as a miners' disease at the beginning of the 20<sup>th</sup> century, leading to the adoption of legislative and public health measures. From 1924, surface foci were also detected in some highly productive agricultural lands, and specific health campaigns were developed in Murcia to match the successful intervention in mines. Hookworm was explained in terms of the geographical and human environment and largely attributed to poor working and living conditions. New rural foci were detected after the Civil War (1936-39), but this time the health administration did not intervene, due to economic shortages or because of the leading role taken by the Institute for Colonial Medicine in this field. Understanding of the disease changed, with a new emphasis on its impact on reproduction, and medical explanations pointed to the negative moral conditions of peasants rather than social issues.

## INTRODUCTION

Concerns about the role of the environment in health contributed to the development of a specific corpus of knowledge in European countries around Public Health (*Higiene Pública* in Spanish). During the 19<sup>th</sup> century, studies in Spain focused mainly on urban populations, as elsewhere in Europe. Health problems in the countryside attracted little attention from these new experts and from the ruling elites, since the cities were generally understood to be the physical and moral setting of modern life. An urban/rural divide developed, associating rural culture with backwardness and tradition, opposed to progress. At the same time, however, a belief in the healthy qualities of the rural life arose in response to demographic data that consistently depicted higher mortality rates in the urban setting. Nevertheless, by the early 20<sup>th</sup> century, the so-called 'myth of the healthy rural life' had been debunked by new evidence from microbiologists and parasitologists.[1-3] Thus, a Rural Health Bureau was founded in Spain in 1910 with the premise that 'the healthy qualities of the countryside are illusions, as soils and sub soils are unclean, air and water are impure, food is not always safe and dwellings are not healthy'.[4]

Ancylostomiasis or hookworm disease undoubtedly played a role in this change. This parasitism was first reported in humans in 1838 and became recognised as an endemic disease in rural environments and a hazard in underground work by the end of the 19<sup>th</sup> century. It was generally first framed as an industrial malady in Europe, linked to underground work in mining or tunnel works and held responsible for a chronic weakness that reduced the productivity of the workforce. In Spain, however, as in Italy and some other Mediterranean countries, hookworm also became considered a risk in agriculture.[5-7]

The aim of this paper was to compare the rationale and content of public health interventions against rural hookworm in Spain between before and after the Civil War (1936-39). The pre-war period saw a growing interest in rural health problems, as a part of a strategy to promote national regeneration and the democratic concept of citizenship as the sum of personal rights and duties in education, health and welfare. This found its greatest expression in the Republican health reform, which made rural health centres the axes of the entire public health system and preserved the educational approach to massive interventions that had been developed in conjunction with the Rockefeller Foundation in the 1920s.[2] Surprisingly, under Franco's dictatorship, the national public health organisation was supplemented with the Institute of Colonial Medicine, which became actively involved in fighting rural hookworm in the Peninsula. While the measures were similar in design to those attempted in the pre-war period, the Institute introduced moral and religious explanations linked to the reactionary values of the winners of the Civil War.

### **ENTER HOOKWORM: THE FORMING OF A NEW SOCIAL DISEASE**

The unequal distribution of land had been a long-lasting social problem in Spain. Liberal policies in early 20<sup>th</sup> century Spain fuelled modernisation of agriculture and supported irrigation projects. These policies led to the first health surveys of the countryside by the Rural Health Bureau, which was active between 1910 and 1918. The surveys focused on malaria and drinking water quality and detected no surface foci of hookworm disease.[8] However, findings in the Linares-La Carolina lead-mining district (Southern Spain) provided epidemiological evidence to support the first legislation against hookworm in the mining industry, passed in 1912 and 1916 (Figure 1). Implementation of these measures

was resisted by mining employers, who were obliged to fund medical examinations of the workforce and drug treatments and to temporarily exclude infected workers from underground activities.[6]

The social effects of the First World War in Spain led reformist political sectors to adopt policies to promote social peace, including rural health. Thus, a state anti-malaria campaign was launched in 1920, led by Dr. Gustavo Pittaluga, head of the Spanish human parasitological school.[9-10] As stated by Pittaluga in 1927, the main goal of the anti-malaria fight was to provide rural people with a minimum of well-being, 'without which there is no human dignity or consciousness of citizenship'.[11]

New legislation on the prevention of hookworm in mines was passed in 1926,[12] following implementation of the 1922 agreement between the Rockefeller Foundation and the Spanish government.[13] A few weeks after his arrival in December 1924, Dr. Charles Bailey, IHB's envoy to Spain, realised that no-one was concerned about hookworm in Spain, with the exception of a few members of the medical profession. However, as in other countries, the IHB succeeded in making hookworm a health priority for the Spanish authorities,[14] supported by epidemiological evidence of its high incidence in mining districts (an estimated 10,000 miners were affected in 1925). The Board argued that hookworm could be easily eradicated and therefore offered the possibility of a successful public health intervention.[6]

From this perspective, the campaign implemented in mining districts can be viewed as a tactic to promote the legitimacy of public health action, considered the sum of educational, environmental and medical practices. Hookworm disease could be diagnosed and easily treated and could be prevented by the use of reliable drugs and latrine construction. This made its eradication an ideal first challenge for the new public health approach that would generate popular support for permanent preventive health services.[15] A Mining Health Bureau created to enforce the legislation was merged with the Central Anti-Malaria Commission in 1930.[16]

Surface hookworm disease became visible thanks to successes in treating miners' ancylostomiasis and the development of the malaria campaign, which brought parasitological expertise and free clinical advice to rural populations and organised local screenings, e.g., for schoolchildren. In the late 1920s and pre-war 1930s, there were a

number of epidemiological studies in some highly productive agricultural areas, i.e., the irrigated plain around the city of Murcia (*La Huerta*), irrigated areas along the river Jucar in Valencia (*Ribera Baja*), the rich lands of *La Plana* in Castellon and the rice-producing delta of the river Ebro (Figure 1).[17-22]

Most surveys confirmed the existence of surface endemic foci, linking them to the natural and human environment, including working and living conditions. Two sets of environmental factors were described, differentiated by their susceptibility to human intervention.[18] Records were made of the physical conditions, including the nature and humidity of soils and mean temperatures, in order to relate empirical data [local reality] to available scientific information [universal knowledge]. Winter-summer temperature differences periodically reduced the number of viable larvae on the land, thought to be one reason why the contagion was not universal in these endemic regions.[20] All of the hookworm surveys, as in malaria studies, also compiled ethnographic data on the daily tasks and employment of peasants. They paid special attention to the common practice of travelling from one area to another for seasonal work. There were medical debates about the risk posed by rice growing, a major agricultural activity in the province of Valencia. Some reports depicted rice fields as ‘natural latrines’ for the transmission of hookworm.[17] **The rice-growing year was considered to comprise** three epidemiological stages: an *aseptic stage* in September-October, a *mildly infective stage* from February to April and in August, and a *fully infective stage* in May, June and July. Differences were related to the presence of migrant seasonal workers, the desiccation of lands and the rhythm and the intensity of work.[17] Another report offers a detailed description of the journeys made every year by peasant work-teams or *cuadrillas* from La Marina county in Alicante.[19] Ten years later, however, other authors claimed that the epidemiological importance of rice fields had been overestimated. They reported that the flooding of land halted development of *Ancylostoma* larvae and that desiccation occurred at times of the year when low temperatures acted as a ‘natural disinfectant’. They proposed that sandy and very humid lands were much more favourable environments for hookworm transmission, citing the vegetable- and fruit-producing plains of the Ribera Baja. They **noted** that almost all rice workers also worked actively in vegetable fields and orchards.[22] In all working situations, these peasants, barefoot and with little clothing, would work from sunrise to

sunset, having to rest, eat and defecate in the fields. These were permanent high-risk features of the working environment.

The disposal of human and animal excrement in the home was also described.[18, 21] Dung was a vital fertilizer and was stored in the back yard of peasant homes, next to the half of the house used as a barn. Humans defecated in the same yard, which was a playground for children. Only a very few houses in villages or out in the countryside had a lavatory or latrine, sometimes connected to a nearby stream or river. The continuous re-infection of women and young children in the Huerta of Murcia was attributed to these conditions.[18] In contrast, there was a clearly lower presence of hookworm in towns with sanitation and drinking water systems and better nutritional levels.[17]

Out of all of the regions with detected endemics, only Murcia succeeded in developing a full-fledged health campaign with a network of rural dispensaries (Figure 2). The campaign started in 1926 and was supported by the Rockefeller Foundation from 1928 until mid-1931, when it came under the National Health Department.[23, 24] Demands for a similar intervention in an endemic area in Valencia province in 1933 do not appear to have been successful, possibly due to the growing political crisis that led to the outbreak of the Civil War. Proposals for a comprehensive prophylaxis policy included: domestic and village sanitation; control of human excrement; a general education campaign; and a full survey of land-workers and families that incorporated a census of hookworm-affected workers, who would be excluded from land work until cured. All measures would be funded by local governments, the National Health Department and the Rockefeller Foundation.[21] The medical authors cited above all framed surface hookworm infection as a social disease. As in mining districts, they emphasised the impact of this debilitating illness on worker productivity and the Spanish economy.

## **HOOKWORM IN RURAL SPAIN AFTER THE CIVIL WAR**

Health conditions in Spain had considerably worsened by the end of the war. The destruction of health facilities, the extension of malnutrition and the outbreak of smallpox, diphtheria, typhus and malaria epidemics shaped the health landscape in the early 1940s.[25, 26] Hookworm only re-emerged as a health concern in the 1950s, when there was an improvement in general health standards. Two major foci were identified in the

countryside **in the mid-1950s**. One was around the River Jucar in Valencia Province, the same endemic area that had attracted attention in the 1920s and 1930s (**Figure 1**). **In 1952**, officials from the Provincial Health Bureau **undertook** a ten-year retrospective epidemiological study **led by Dr Vidal, former Provincial Health Officer during the Republic, with the collaboration of 232 local municipal physicians. The final report concluded** that the **hookworm** endemic was a long-lasting and severe health problem in a rural area of 270 square kilometres with a population of around 118,000 inhabitants. A morbidity rate of 600 cases per year was estimated. Despite the low mortality rate of the disease, **Vidal claimed that severe cases ‘could suffer sterility and a tendency to spontaneous abortions’**.<sup>[27]</sup> **By emphasising the negative effects of hookworm on reproduction, Vidal connected with one of Franco’s key social policy concerns, which was to increase the birth rate.**

**Vidal called** for a campaign that included the construction and use of lavatories and latrines, education of the rural population in health and sanitation matters, and treatment of carriers and sufferers.<sup>[27, 28]</sup> When these plans were laid out at the 4<sup>th</sup> National Conference of Health Officers in 1955, the Head of the Provincial Health Bureau of Valencia announced that, although desirable, they could not be implemented because currency shortages prevented importation of the necessary drugs.<sup>[29]</sup> While the action taken by provincial health authorities to identify and respond to this endemic speaks to a continuity in their public health role, the lack of governmental support reflects the indifference of the **new** regime to rural health issues. **Apparently, the educational side of the campaign, although not dependent on the supply of medicines, was simply disregarded.**

A **second** endemic focus was **in** irrigated land around the rivers Henares and Jarama on the South-eastern outskirts of Madrid (**Figure 1**). In 1947, a warning had been issued by hospital physicians but to no avail.<sup>[30]</sup> It was not until 1950 that a voluntary hookworm survey was started, surprisingly, by the Spanish Institute of Colonial Medicine. This Institute had been set up in 1944 under the General Directorate for Colonial Administration and participated in the Higher Council for Scientific Research, the main institution supporting science in Franco’s Spain. It was under the guidance of Valentin Matilla, Professor of Parasitology and Tropical Diseases, who had replaced the exiled Pittaluga, and was Secretary of the School of Medicine of Madrid University. **The main goals of the Institute were to carry out**



epidemiological surveillance in the Spanish colonies, to provide parasitological training and to arrange medical examinations for officials returning from Africa.[31, 32] The Institute essentially comprised only Valentin Matilla and his assistant, and played no role in the colonies. Nevertheless, Matilla, heavily engaged in administrative and religious affairs, used the Institute to exert influence over health administrators, over which he had no official authority.[33] It was in this context that Antonio Prieto, a local physician at San Fernando de Henares, approached Matilla in 1949 to develop a thesis on the presence of hookworm disease at his village. This academic endeavour, which earned Prieto a position at the Institute and at the Public Health service, turned into a one-man health campaign. Seven years later, he complained of the continuing risk of a massive regional epidemic due to the lack of support for his intervention.[34]

The Jarama focus appeared as a surface endemic linked to agricultural activity. By mid-1950, Prieto had counted more than 100 clinical cases, which increased to over 300 by 1954, out of a local population of fewer than 4,000 inhabitants in three neighbouring villages.[35] Cases were detected among patients at Prieto's surgery in San Fernando or were referred by nearby colleagues. Properly speaking, there was no organised health survey or campaign.

Prieto considered the rural environment to be pathological because of the climatic and topographic conditions and the unsanitary habits of the population. However, he associated the habit of defecating in open spaces and the non-use of latrines with a morally depraved state of rural peasants rather than with the poor living and working conditions. In his opinion, their moral state included a tendency to alcoholism, lack of devotion to the Catholic faith and frequent resort to quacks, which he cited as evidence of the low social, intellectual and natural status of the peasant population.[36] In this way, Prieto and his colleagues at the Institute of Colonial Medicine shifted the framing of hookworm from a social to a colonial disease, with an approach to Spanish rural populations that was influenced by concepts used to describe African native populations in the colonial setting.[37]

In 1954, following his early involvement with hookworm, Dr Prieto proposed an ambitious national antihelminthic campaign to cover all human intestinal parasitism throughout the country. He called for examinations of the whole population, using coercive measures to ensure compliance. He wanted medical treatment to be freely available and sanitation measures to be carried out, including the compulsory building of lavatories or latrines in

homes and close to work sites. Prieto **called for** persuasive and educational measures to be adapted to the secular profile of the Spanish farm worker, characterized as: ‘fatalistic, ignorant, selfish, superstitious and distrustful’.[35] The campaign was to be directed by a staff of parasitological experts. In fact, Prieto’s proposal appears designed to increase the importance of his particular professional group and to secure better positions in the Public Health administration.

**By** the mid- and late-1950s, food supply problems in Spain had eased and mortality rates from infections had reduced to general European levels.[38] **Isolated hookworm cases continued to be reported but were described as residual.**[39, 40] In this context, and with the rise of new health concerns, including cancer and viruses, no political priority was going to be given to **hookworm** or any other parasitological disease.

## CONCLUSIONS

Responses to the hookworm threat between **before and after the Spanish Civil War** **illustrate the** political dimension of public health interventions and the social values that **mediated** different approaches. In the 1920s and 1930s, rural health in Spain was perceived in the context of general social unrest, while health campaigns against parasitological diseases were designed to lessen their effects on workers’ productivity and dignify peasants as full citizens. In contrast, the **Franco regime’s approach to** rural populations in the 1940s and 1950s was dominated by ideas of their low social and moral status, and **hookworm** was considered in a colonial framework. This also entailed a narrowing of the environmental conception of the disease. In the pre-war years, the pathological environment was considered to comprise both natural and human factors, the latter mostly related to poor **rural** working and living conditions. After the war, human factors were given greater weight, mainly in relation to the ‘naturally depraved’ condition and ‘mental inferiority’ of the peasants.

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## FIGURE LEGENDS

Figure 1. Main hookworm foci in Spain 1910-1955

 Linares-La Carolina mining district

 Hookworm foci in rural zones

1 *La Huerta*, Murcia

2 *Ribera Baja*, Valencia

3 *La Plana*, Castellón

4 Delta of Ebro river

5 Henares and Jarama rivers

Figure 2. Laboratory of the campaign against hookworm in *La Huerta* (Murcia, 1927)

Source: Guillamón A. *El problema de la anquilostomiasis en la Huerta de Murcia. Memoria de la campaña de divulgación autorizada por el Excmo. Ayuntamiento y de los trabajos realizados*. Murcia: Estudios Médicos 1927.

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