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(Not) the smallest of enemies
Tuberculosis in the German Army 1914–1935**

Nie najmniejszy z wrogów
Gruźlica w niemieckiej armii w latach 1914–1935

Abstract: This article presents the incidence of *tuberculosis* (TB) in the German armed forces from 1914 (outbreak of World War) to 1935 (restoration of universal conscription in Germany). The main aim of the study is to determine the factors that affected the scale of tuberculosis in the German armed forces between 1914 and 1935. In addition, attention is paid to the question of the attitude of military authorities towards tuberculosis both during the Great War and in the interwar period. Finally, issues connected with the prevention and treatment of tuberculosis in the armed forces are addressed. Official summaries of the health status of the German army during the Great War and the post-war era, as well as laws, were used as the basis for this work.

Keywords: tuberculosis, army, history of German medicine

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Streszczenie: Niniejszy tekst został poświęcony kwestiom związanym z występowaniem gruźlicy w armii niemieckiej między 1914 a 1935 r. Tekst otwierają rozważania na temat występowania chorób w wojsku w czasie trwania działań wojennych zawierające m.in. porównanie liczby rannych i chorych żołnierzy w armiach niemieckiej i austro-węgierskiej. Dalsza część pracy przedstawia skalę zachorowalności na gruźlicę w wojsku niemieckim w latach 1914–1935 oraz zmiany stosunku władz wojskowych do wystąpienia zachorowań. Dalsza część artykułu stanowi ilustrację metod służących do przeciwdziałania obecności chorób społecznych w armii, zarówno w czasie pokoju, jak i trwania wojny. Tekst uzupełniają dwa wykresy i jedna tabela.

Słowa kluczowe: gruźlica, armia, historia niemieckiej medycyny

In the past, it has been stated that armed forces are a representation of the society from which they are formed. However, this was often not an accurate representation. For centuries, the armed forces included only male members of particular communities. Additionally, the image was distorted due to changes which occurred when transitioning from a civilian society into an army structure. For these reasons, the army did not represent all the citizens of a given country. The lack of representation of a full cross-section of social classes in the army would only disappear after the second half of the 20th century. During the 19th century, universal military service became the norm in Europe, with few exceptions. Universal military service provided the armies of continental Europe with a massive influx of recruits and a significant number of trained reserves ready for almost immediate mobilisation. This was also the reason why all classes of society were present within the army.

Mass conscription to the army meant that problems plaguing a modernising society were increasingly apparent in the armed forces. One of these problems was the spread of disease. Even during the beginning of an era in which modern methods of organisation within the armed forces became widespread, microorganisms were taking a deadly toll on the army. The scale of this phenomenon can be considered significant. According to research conducted by Professor Michał Baczkowski from the Jagiellonian University, the regiments forming the Austrian Garrison of Kraków in the

years 1796–1809 lost an average of 100 soldiers annually due to disease. The losses suffered to disease often exceeded those inflicted by the enemy during campaigns against the French.[1]

The almost century-long period between the Napoleonic era and World War I brought clear changes to how armies functioned, including the improvement of accommodation and nutrition for soldiers.[2] Microbiology and antiseptics were developing at the same time. However, these improvements did not directly translate to lower morbidity among soldiers, which remained significant, especially during times of war. These issues relating to infectious diseases are reflected by the literature on sanitary services of individual armies. Notable works include those by Brigitte Biwald, who devoted her doctoral dissertation to the Austro-Hungarian sanitary services during World War I,[3] and Mark Harrison, who studied the British medical services.[4] However, despite the availability of the aforementioned literature, the studies tend to be superficial in nature.

The issue of infectious diseases in the army during times of peace is less frequently represented in the literature. This is the case for tuberculosis, a common infectious disease of the second half of the 19th century as well as the first half of the 20th century. However, this disease has been studied

[1] M. Baczkowski, *Wojsko austriackie w Krakowie w latach 1796–1809*, Kraków 2007, p. 104.

[2] By the end of the 19th century, the size of military rations began to be determined on the basis of the achievements of dietetics, which at least partly demonstrates the concern for the physical condition of soldiers. I. Munk, J. Uffelmann, C. A. Ewald, *Ernährung des gesunden und kranken Menschen. Handbuch der Diätetik für Ärzte, Verwaltungsbeamte und Vorsteher von Heil- und Pflege-Anstalten*, Wien 1895, pp. 212–213.

[3] B. Biwald, *Von Helden und Krüppeln. Das österreichisch-ungarische Militärsanitätwessen und dessen Auswirkungen auf die Gesellschaft im Ersten Weltkrieg*, Wien 2000 (unpublished PhD thesis).

[4] M. Harrison, *The medical war: British military medicine in the First World War*, Oxford 2010.

in the context of society as a whole.[5] Likewise, strategies for the control and management of tuberculosis have also been analysed.[6]

This article presents the incidence of *tuberculosis* (TB) in the German armed forces from the outbreak of the First World War until 1935, when the Nazis reintroduced universal military service in Germany in unilateral violation of the Treaty of Versailles.[7] The main aim of the research is to determine the factors that influenced the extent of tuberculosis in the German armed forces between 1914 and 1935. In addition, attention is paid to the attitude of the military authorities towards tuberculosis during both the Great War and the interwar period. Finally, the prevention and treatment of tuberculosis in the armed forces are analysed. The work was based on official summaries of the health status of the German army during the Great War and the post-war era[8] and the law.[9] Memoirs also constitute a valuable addition to the source base.[10]

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[5] T. M. Daniel, *Captain of death. The story of tuberculosis*, Rochester 1997; T. Dormandy, *The white death. A history of tuberculosis*, London–Rio Grande 1999; K. Waddington, *The bovine scourge meat, tuberculosis and public health, 1850–1914*, Woodbridge 2006; J. Voigt, *Tuberkulose Geschichte einer Krankheit*, Koeln 1994; F. B. Smith, *The retreat of tuberculosis 1850–1950*, London 1988; V. Kirshnan, *Phantom plague. How tuberculosis shaped history*, New York 2022.

[6] D. L. Ellison, *Healing tuberculosis in the woods*, London 1994; T. M. Daniel, *Pioneers of medicine and their impact on tuberculosis*, Rochester 2000; T. Goetz, *The remedy. Robert Koch, Arthur Conan Doyle, and the quest to cure tuberculosis*, New York 2014.

[7] *Gesetz für den Aufbau der Wehrmacht*, in: *Reichsgesetzblatt*, Teil I, Jahrgang 1935, Berlin 1935, pp. 375–380.

[8] *Sanitätsbericht über das Deutsche Heer im Weltkrieg 1914/18*, Bd. 3: *Die Krankenbewegungen bei dem Deutschen Feld- und Besatzungsheer*, Berlin 1934; *Sanitätbericht über das Reichsheer für das Jahr 1930 (1. Januar bis 31. Dezember)*, Berlin 1933; *Sanitätbericht über das Reichsheer für das Jahr 1932 (1. Januar bis 31. Dezember)*, Berlin 1934; *Sanitätbericht über das Reichsheer für das Jahre 1933 (1. Januar bis 31. Dezember)*, *1934 (1. Januar bis 31. Dezember) und für 1935 (für die Zeit vom 1. Januar bis 30. September 1935)*, Berlin 1940.

[9] *Verordnung zur Bekämpfung der Geschlechtskrankheiten*, in: *Reichsgesetzblatt*, Teil I, Jahrgang 1918, p. 1431; *Verordnung über Fürsorge für geschlechtskranke Heersangehörige*, in: *Reichsgesetzblatt*, Teil I, Jahrgang 1918, p. 1433; *Gesetz zur Bekämpfung der Geschlechtskrankheiten*, in: *Reichsgesetzblatt*, Teil I, Jahrgang 1927, Berlin 1927, pp. 536–541.

[10] Н. Гумилёв, *Записки кавалериста, Мемуары о первой мировой войне, bmidw*, Moskwa 2014; A. Krasicki, *Dziennik z kampanii rosyjskiej 1914–1916*, Warszawa 1988.

Caused by the *mycobacterium tuberculosis* (*Mycobacterium tuberculosis*), also known as Koch's bacillus after its discoverer, tuberculosis is transmitted by droplets. In the past, *mycobacteria* (*Mycobacterium bovis*), of which domestic cattle are the primary carrier, were also often responsible for infection. In such cases, the bacterium is transmitted orally through the consumption of meat or milk.

Tuberculosis can remain inactive in the human body or invade its various systems. Both the activation and the location of the disease depend on the living conditions and the general health of the infected person. In the first half of the 20th century, the most common pulmonary form of TB was divided into open (the patient is mycobacterial, i.e. secretes mycobacteria and is therefore contagious with TB) and closed (epidemiologically less dangerous). Other systems can also fall prey to the disease; examples include the bones (if the spine is affected, it can also spread to the renal system), joints, skin, peritoneum and the organs within it, the urinary system and the reproductive organs. The tubercle bacillus also causes scrofulosis, or tuberculosis of the lymph nodes. It should be noted that the latter type of disease ceased being mentioned as a matter of serious concern in medical reports from the 1890s onwards.[11]

Impact of the First World War on the development of tuberculosis in Germany

At the dawn of the 20th century, tuberculosis was one of the most dangerous infectious diseases. Between 1901 and 1913, tuberculosis killed between around 95,000 and just over 120,000 people a year in Germany, with a clear, albeit slow, downward trend since 1905. However, it is virtually impossible to determine the percentage of German subjects infected with Koch's bacillus at the end of the Hohenzollern monarchy and between the wars, due to the lack of relevant statistics. For the first time, data of this kind on the number of cases throughout the Reich were only collected in 1938.[12]

[11] *Militär-statistisches Jahrbuch für das Jahr 1894*, Wien 1896, pp. 274–275.

[12] H. P. Pöhn, G. Rasch, *Statistik meldepflichtiger übertragbarer Krankheiten. Vom Beginn der Aufzeichnungen bis heute*, München 1994, pp. 86–87.

One can venture to say that prior to the First World War, tuberculosis was not a serious sanitary problem for the German armed forces. Between 1908 and 1913, active Koch's bacillus, irrespective of the location of the infection, was found in an average of 1.8 per thousand soldiers annually, with an average mortality rate of 9.3% of those infected. The predominant form of tuberculosis was pulmonary.[13]

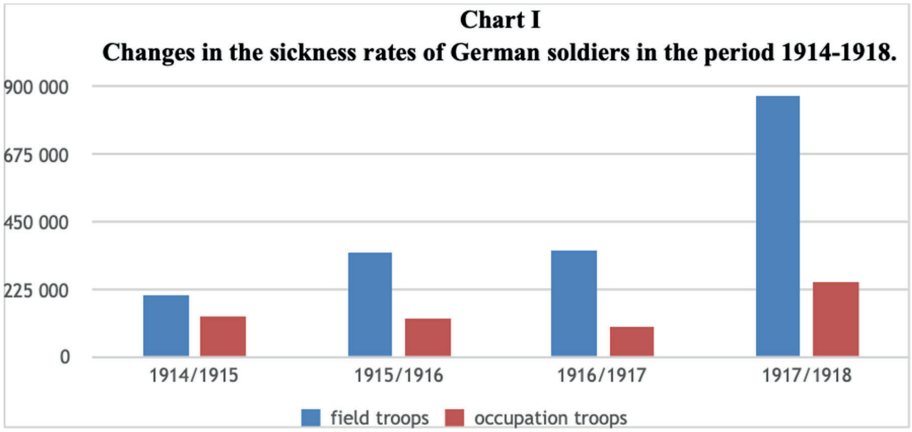
However, the situation changed during the First World War. Between August 1914 and the summer of 1918 (official figures for the period after July 1918 are missing), the incidence of tuberculosis was part of a general upward trend in the number of disease cases in the German army. During this period, 2,411,870 Hohenzollern soldiers contracted various diseases, an average of 602,968 cases per year. This means that approximately 18% of all soldiers in the armed forces of the Second Reich suffered from disease, making this the second most common cause of death after wounds. It should be noted that mycobacteria were responsible for about one in twenty of the above infections.[14] The changes in the total number of infections during the different stages of the war are shown in Chart I.

The overall number of sick soldiers increased successively as the war effort dragged on. This trend is particularly noticeable in the case of the field troops, although before the Spanish flu was brought to Europe and after the clear spike in the first year of the war, morbidity increased slowly (the difference between 1915/1916 and 1916/1917 is just under 9,000 cases). In contrast, the number of cases of infectious diseases among the occupation troops was declining before the outbreak of the pandemic. Both the dichotomy of the morbidity of the field and occupation armies and the

[13] *Sanitätbericht über das Reichsheer für das Jahr 1930…*, p. 13.

[14] *Sanitätsbericht über das Deutsche Heer im Weltkrieg 1914/18*, Bd. 3, pp. V, 63, 89; *Der Weltkrieg 1914 bis 1918. Die militärischen Operationen zu Lande*, Bd. 14: *Die Kriegführung an der Westfront im Jahre 1918*, Berlin 1944, Beilage 43. The catalogue of diseases that reduced the combat capability of the army in both war and peace was very broad. These included the group (*Influenza*), *smallpox* (*Varicella/Variola vera*), the government summary does not specify the division between smallpox and smallpox), measles (*Morbilli*), diphtheria (*Scarlatina*), diphtheria (*Diphtheria*) or diseases of the digestive system, Such as typhoid fever (*Salmonella typhi*), dysentery (*Dysenteria*) and cholera (*Cholera asiatica*).

gradual increase in the morbidity of soldiers were determined by a number of factors.



Source: Sanitätsbericht über das Deutsche Heer im Weltkrieg 1914/18, Bd. 3: Die Krankenbewegungen bei dem Deutschen Feld- und Besatzungsheer, Berlin 1934, pp. 63, 89.

Stress and combat exhaustion led to lowered resistance. Both of these phenomena affected soldiers of line formations far more often than of occupation formations, whose task was to maintain order in territory taken from the enemy.

Soldier fatigue was also influenced by the state of their accommodation, a feature that depended on issues such as the section of the front, the intensity of the operations carried out or even the character of the commanding officers. Occupation troops, at least in theory, were able to use better prepared shelters most often not exposed to destruction by the enemy, which would partly explain the lower morbidity rate. It should be stressed that it was not only the quality of the buildings designated as quarters that was important in terms of the incidence of tuberculosis, but also the maintenance of cleanliness in them. This fact, moreover, was recognised as early as the 19th century, which resulted in the introduction of regulations into the military regulations prescribing, among other things, the ventilation of rooms, the wiping of dust or the frequent sweeping of floors in the living

quarters.[15] Maintaining these regulations, which were very similar to civilian anti-tuberculosis recommendations, was not always possible during wartime, especially in the field, and this encouraged an increase in Koch's bacillus infection.

However, the incidence of tuberculosis among German soldiers and civilians between 1914 and 1918 was influenced primarily by the economic collapse of the Central Powers. The health of the German population was particularly affected by the crisis in agriculture, which translated into a drastic deterioration of provisions noticeable especially in the cities, leading to food rationing in Germany and a flourishing black market. The reasons for this were complex. Firstly, in the Reich, as a result of a shortage of manpower (most men of working age were conscripted into the army and replacing them with women and prisoners of war proved ineffective), the mobilisation of the clutch and the conversion of industrial production to a war footing (the reduction in fertiliser production proved particularly acute for agriculture), the area of arable land declined. Secondly, the decline in coal mining, combined with the commitment of means of transport to the army, made it difficult to transport agricultural produce to the cities. Nor did the Entente-led naval blockade of Germany improve supply. However, its impact on the collapse of victualling in the most important of the Central Powers was limited. In the second half of 1918, when the blockade reached its apogee, the food situation in the Reich was already slightly better than during the disastrous swede winter of late 1916 and early 1917.[16]

As a result of the above-described state of affairs, the victualling of German civilians remained poor for most of the war. Between August 1914 and April 1917, a German city dweller basing his diet solely on products from official sources lost an average of around 830 grams of body weight per month (actual weight loss was even faster).[17] By contrast, by the end of the war, the

[15] E. von Wurmb, *Dienstunterricht des duetschen Infanteristen*, Berlin 1915, p. 16.

[16] A. Kramer, *Naval blockade (of Germany)*, in: *1914–1918 online. International encyclopedia of the First World War*, last updated 22 January 2020; B. Davis, *Food and nutrition (Germany)*, in: ibidem, last updated 8 January 2017.

[17] B. Davis, op. cit.

energy value of a Berliner's daily ration fluctuated around 1,000 calories.[18] The German army also had problems covering its food needs. The calorific value of a military meal decreased from around 4,400 calories in 1914 to a level of 2,500 calories in late 1917 and early 1918.[19] Thus, towards the end, the military ration coincided with the lower limit of daily energy requirements for an adult male with a moderately active lifestyle, and the ration for a civilian corresponded to the energy requirements of a child aged *between 1 and 3 years*![20] This state of affairs led to rapid weakening of the body, which increased susceptibility to contracting not only tuberculosis but also other diseases. The effects of the supply problems afflicting the Second Reich were also felt after the end of the war and particularly affected the bodies of adolescents growing up in times of food shortages.

The supply problems gripping the Central Powers were also reflected in the condition of the recruits used to replenish the troops. In the later stages of the war, it was not only malnourished soldiers who were conscripted into the ranks, but also increasingly younger recruits and conscripts previously deemed unfit for service (as early as September 1915, a decision was taken to review pre-war decisions on unfitness for service).[21] Thus, a significant number of weaker people, more susceptible to infection, were enrolled in the army.

As a result of the above phenomena, the number of German subjects dying from tuberculosis increased from around 93,000 in 1914 to almost 148,000 in 1918, an increase of 59%. In parallel, despite the war losses affecting the demographic statistics, the turberculosis-related mortality rate also increased towards the end of the war reaching the level of the 1890s.[22]

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[18] E. Cronier, *Food and nutrition*, in: *1914–1918 online. International encyclopedia of the First World War*, last updated 22 June 2021.

[19] *Der Weltkrieg 1914 bis 1918. Die militärischen Operationen zu Lande*, Bd. 14, pp. 10, 31; E. Cronier, op. cit.

[20] H. Kunachowicz et al., *Liczymy kalorie*, Warszawa 2020, pp. 11, 16.

[21] *Der Weltkrieg 1914 bis 1918. Die militärischen Operationen zu Lande*, Bd. 14, p. 29; D. Stone, *The Kaiser's army. The German army in World War One*, London–New York 2015, p. 177

[22] H. P. Pöhn, G. Rasch, op. cit., pp. 86–87.

Between 1914 and 1918, the number of tuberculosis cases in the army increased. During the war, 134,149 German soldiers suffered from consumption (82,855 were hospitalised). Of this number, only about 38.4 per cent returned to duty. Of the remainder, 59,744 patients were declared unfit for combat and a further 19,337 died. During the conflict, there was a clear trend towards an increase in the scale of TB mortality. While during the first thirty months of the war (August 1914 to January 1917) the German army lost 6,270 soldiers irretrievably due to tuberculosis (5,469 died of the pulmonary form of tuberculosis), i.e. an average of 209 men per month. In the final period of the war, this rose to an average of 653.35 soldiers per month, i.e. by more than a factor of three.[23]

The drastic increase in morbidity rates was in part due army rations, as well as changes in the attitudes of authority figures towards soldiers suffering from tuberculosis. Until January 1917, consumption caused the discharge of 40,595 soldiers, giving an average of approximately 1,353 soldiers per month. However, during the last two years of the war, only 19,149 men were released from service, meaning an average of approximately 957 per month (which is almost 400 soldiers less than in the early years of the war).[24] This decrease in the release of soldiers from service was due to the exacerbation of manpower shortages in the German army, which contributed to the exposure of soldiers to those who were sick, increasing the rate at which the disease spread. Additionally, as the German economy collapsed in the last few years of the War, demobilisation did not provide a guarantee for conditions which would contribute to curing consumption.

Tuberculosis in the armed forces of the Weimar Republic

The high contribution imposed on Germany by the provisions of the Treaty of Versailles shook the foundations of the German economy. In addition, the territorial cessions (resulting directly from the treaty and from the plebiscites in the disputed territories established by its provisions) un-

[23] *Sanitätsbericht über das Deutsche Heer im Weltkrieg 1914/18*, Bd. 3, pp. 123–124.
[24] Ibidem.

dermined the defensive and economic potential of the country, also leading to a reduction in population. This state of affairs did not go unnoticed with regard to the incidence of tuberculosis in Germany. Between 1919 and 1920, the number of deaths caused by Koch's bacillus in Germany fell from 131,264 to 92,902. On the one hand, this was due to the fact that some of the tuberculosis-infected former German subjects remained in the territories allocated to neighbouring countries, and on the other hand, it was related to the temporary improvement in living conditions resulting from the cessation of hostilities. It should be noted that after 1919, a steady decrease in the number of German citizens who died of tuberculosis can be observed (to about 47,000 in 1934). Between the conclusion of the armistice and the restoration of compulsory universal military service in the Reich, an increase in the number of deaths due to tuberculosis was only recorded between 1921 and 1923 (again, this was related to Germany's catastrophic economic situation and the prevailing hyperinflation) and between 1934 and 1935. Although Germany was among the countries most severely affected by the Great Depression of 1929, it did not affect the extent of the toll taken by Koch's bacillus.[25]

The Treaty of Versailles did not go unchallenged by transforming the German armed forces into a professional army, which, according to later arrangements, would number 100,000, including 4,000 officers. The term of service for privates and non-commissioned officers was set at 12 years and 25 years for officers. Only 5% of the army's personnel could be replaced each year.[26] The armed forces had to be reduced by 1 January 1921 at the latest.

During the first five years of its existence, the Reichsheer (Reich Land Forces) struggled with a significant tuberculosis morbidity problem. Between 1921 and 1925, an average of 3.7‰ soldiers per year struggled with active Koch's bacillus, more than double the number before the outbreak of the First World War. Such a marked increase in the proportion

[25] H. P. Pöhn, G. Rasch, op. cit., pp. 86–87.

[26] *Wehrgesetz vom 23 März 1921*, "Heeresverordnungsblatt" 1921, no. 15, p. 115; *Gesetz über den Friedensschluss zwischen Deutschland und den alliierten und assoziierten Mächten vom 16 Juli 1919*, "Reichsgesetzblatt" 1919, no. 140, art. 173–179, pp. 931–935.

of soldiers with tuberculosis was due to at least two factors. Firstly, veterans of the Great War, i.e. people who may have come into contact with Koch's bacillus while they were still engaged in warfare, were primarily sent to the professional army. In addition, their bodies were burdened by the experience of combat, which often took a serious toll on physical health, including immunity (both facilitating tuberculosis infection and activating bacteria already present in the body). Secondly, the increase in the incidence of the disease during the above period was linked to the difficult economic situation in Germany at the end of the Great War and the first post-war years leading to a decline in the population's standard of living. An argument in support of the above conclusions is the attention to the distribution of illnesses between the vintages of recruits. As late as 1930, of the 286 cases of pulmonary tuberculosis recorded in the army, as many as 88 (about 30%) were among soldiers who had been in service for ten to twelve years, i.e. veterans of the Great War or those who had grown up during the Great War or in the first post-war years. In addition, the increased incidence of the disease was also influenced by the more frequent use of new diagnostic methods (X-ray apparatus), which made it possible to detect the developing disease earlier. So, the number of diagnosed cases of tuberculosis rose over time.[27]

During the last ten years of the Reichsheer, there were between 1.12 and 3.56 cases of tuberculosis per 1,000 soldiers per year, and, as in previous years, the pulmonary form was predominant. For most of this interval, from 1928, when the peak incidence of 3.56‰ occurred, until 1934 (1.12‰ of soldiers suffering from tuberculosis), there was a clear trend towards a decrease in incidence. This had to do with the gradual departure from service of veterans of the First World War (in 1933, 12 years of service for the 1921 enlistment were expiring). In 1935, on the other hand, the percentage of sick people increased by 0.023 percentage points. The German military authorities responsible for compiling the statement linked this unfavourable change to the more seldom use of X-ray machines in the examination of soldiers (from 16% of patients examined in 1934 to 3.8% in

[27] *Sanitätbericht über das Reichsheer für das Jahr 1930…*, pp. 13–14; *Sanitätbericht über das Reichsheer für das Jahr 1932…*, p. 18.

1935).[28] It seems that this step was at least in part due to the reintroduction of universal military service in Germany in March 1935, as the aforementioned increase in tuberculosis-induced mortality in the civilian population occurred at the same time. Additionally, the massive influx of recruits could not have been without a negative impact on the thoroughness of the medical examinations to which conscripts were subjected.

Table 1. Cases of various strains of tuberculosis per 1000 army personnel

		Pulmonary	Central Nervous System	Abdomen	Urinary tract	Bones and joints	Other bodies	Cutaneous form
1932	**Total**	**2.29**						
	Officers	1.85	–	–	–	–	–	–
	NCOs	2.08	–	–	0.15	0.05	0.03	–
	Soldiers	1.97	0.01	–	0.03	0.08	0.13	0.01
1933	**Total**	**2.17**						
	Officers	2.04	–	–	–	0.45	–	–
	NCOs	2.77	–	–	0.05	–	–	0.05
	Soldiers	1.70	0.01	0.03	0.01	0.07	0.16	–
1934	**Total**	**1.12**						
	Officers	1.82	–	–	–	–	–	–
	NCOs	1.09	–	–	–	0.03	0.03	0.21
	Soldiers	0.78	0.01	0.03	0.02	0.03	0.09	0.05

[28] *Sanitätbericht über das Reichsheer für das Jahr 1930…*, p. 13; *Sanitätbericht über das Reichsheer für das Jahr 1932…*, p. 17; *Sanitätbericht über das Reichsheer für das Jahre 1933…*, pp. 14, 16.

Table 1. Cases… (continued)

		Pulmonary	Central Nervous System	Abdomen	Urinary tract	Bones and joints	Other bodies	Cutaneous form
1935*	**Total**	**1.35**						
	Officers	1.55	–	–	–	–	–	–
	NCOs	1.11	–	–	0.09	0.02	0.05	–
	Soldiers	1.12	0.03	0.04	0.03	0.06	0.08	0.02

** Data for the period from 1 January to 30 September 1935.*

Source: Sanitätsbericht über das Reichsheer für das Jahr 1932 (1. Januar bis 31. Dezember), Berlin 1934, p. 81; Sanitätsbericht über das Reichsheer für das Jahre 1933 (1. Januar bis 31. Dezember), 1934 (1. Januar bis 31. Dezember) und für 1935 (für die Zeit vom 1. Januar bis 30. September 1935), Berlin 1940, pp. 129, 159, 185.

Table 1 illustrates the percentage of tuberculosis cases within the ranks of the Reichsheer, during the last four years of its existence. The table highlights how widespread the pulmonary strain of tuberculosis was when compared to its other strains. It also illuminates the distribution of tuberculosis amongst the various ranks of soldiers. Koch's lung-destroying bacillus affected officers, non-commissioned officers and private soldiers. The incidence rates presented in 1932 were very similar between all three ranks of army personnel. However, the later years demonstrate a decrease in incidence rates of lower ranking soldiers. The higher morbidity amongst officers was in part due to the length of their service. A significant number of officers had contracted Koch's bacillus during the war, but had remained at their post due to their significant experience or valuable technical knowledge. In contrast, the prospect of a soldier remaining in service was dependent on the scale of epidemiological threat and whether the solider had suffered from open or non-open tuberculosis (mycobacterium). In the event of open tuberculosis, demobilisation was recommended for the solider. When

comparing the percentage of cases of open tuberculosis and the percentage of soldiers considered unfit for service during 1933–1935, it can be deduced that more than 2% of soldiers with open tuberculosis were allowed to remain in the ranks annually. It was not until 1935 that these cases were excluded.[29] By allowing infected soldiers to remain in the ranks, the risk of spreading consumption increased.

It is also important to note the distribution of cases of tuberculosis between different branches of service. During 1932–1935, the soldiers serving in medical units were most susceptible to contracting Koch's bacillus, due to the nature of their work and frequent exposure to various pathogens. In the 1930s, approximately 0.3% of people were suffering from this form of the disease. In 1935, the percentage of people infected with this form of the disease had decreased, in part due to the expansion of the total army personnel which in turn led to the increase of soldiers working in medical units, increasing the total number of soldiers to be included in percentage calculations. Tuberculosis was less common among other soldiers such as artillery men, sappers or transport troops.[30]

The incidence rate of tuberculosis in the Reichsheer was high when compared to other armies during the interwar period. In the British army, the percentage of infected soldiers did not exceed 0.2%, remaining relatively stable with maximal deviations of 0.05%. American soldiers were also less affected by tuberculosis when compared to the German army, but had higher infection rates when compared to the British army. However, despite higher incidence rates within the German army, it was the only army which experienced a gradual decrease in incidence rates.[31]

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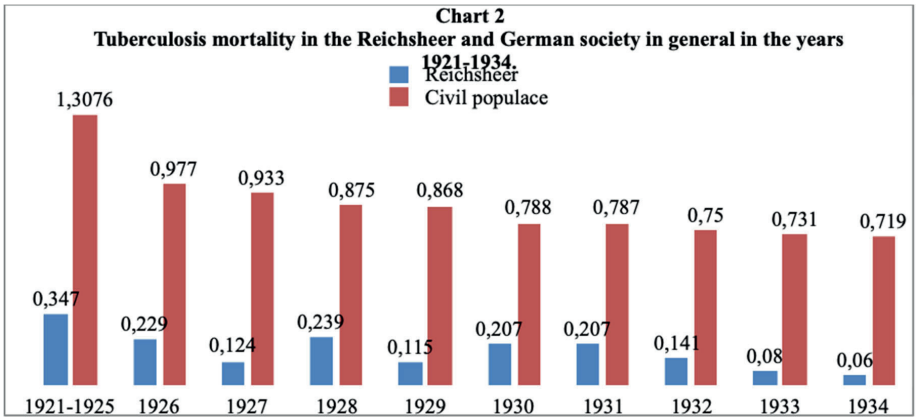
[29] *Sanitätbericht über das Reichsheer für das Jahre 1933…*, p. 15.

[30] *Sanitätbericht über das Reichsheer für das Jahr 1932…*, pp. 80–81; *Sanitätbericht über das Reichsheer für das Jahre 1933…*, pp. 128–129.

[31] *Sanitätbericht über das Reichsheer für das Jahre 1933…*, p. 15. The morbidity rate reported by the Reichsheer and the armies of the Anglo-Saxon states was low in relation to that recorded by those armies relying on conscription. In the French army about 0.404 per cent of private soldiers suffered from consumption, and 0.068–0.074 percent of all soldiers died from the disease as late as the mid-1920s. The situation was even worse among the occupying troops forming the Army of the Rhine, in which, in 1922, 1.184 per cent of soldiers were ill with tuberculosis, and the death rate reached 1.44 per



Source: Sanitätsbericht über das Reichsheer für das Jahr 1930 (1. Januar bis 31. Dezember), Berlin 1933, p. 13; Sanitätsbericht über das Reichsheer für das Jahr 1932 (1. Januar bis 31. Dezember), Berlin 1934, p. 17; Sanitätsbericht über das Reichsheer für das Jahre 1933 (1. Januar bis 31. Dezember), 1934 (1. Januar bis 31. Dezember) und für 1935 (für die Zeit vom 1. Januar bis 30. September 1935), Berlin 1940, p. 14; H. P. Pöhn, G. Rasch, Statistik meldepflichtiger übertragbarer Krankheiten. Vom Beginnder Aufzeichnungen bis heute, München 1994, p. 87.

Chart 2 compares the mortality rates of tuberculosis in the Reichsheer and German civilian populations. Data pertaining to the incidence rates of tuberculosis within these two populations is not available.

During the interwar period and prior to the restoration of universal conscription in Germany, tuberculosis was the cause of death among 2.4% to 5.8% of sick soldiers per year. This comprised 0.006% to 0.0347% of all members of the armed forces. The morbidity rates of the civilian population during this time were higher, ranging from 0.0719% to 0.13076%. This significant difference in morbidity rates was partly due to the professionalism maintained by the Reichsheer. Other factors contributing to the lower morbidity rates of tuberculosis in soldiers were the selection of soldiers who comprised the armed forces. When the Reichsheer was being formed, recruits were selected more carefully than when troops were enlisted through universal conscription. Through careful soldier selection and

1,000 people (these were largely colonial troops). Cf. *Sanitätbericht über das Reichsheer für das Jahr 1930…*, p. 13.

professionalism of the Reichsheer, the development and spread of tuberculosis was minimised, which resulted in a lower mortality rate. In addition to the aforementioned reasons, soldiers diagnosed as terminally ill with tuberculosis often could not be considered fit for service. This would result in the dismissal of a soldier, allowing the soldier to return to civilian life, as long as international legal regulations allowed it. Therefore, a person suffering from tuberculosis did not die in the army, but instead died within the civilian population and was not included in military statistics.

Despite the higher mortality rate of tuberculosis in the civilian population, Graph 2 illustrates that tuberculosis was still present within the ranks of the German army during World War I and the interwar period. As authorities within the German army were aware of the risk of spread of tuberculosis, attempts were made to discharge the soldiers suffering from this disease. In addition to discharging soldiers diagnosed with tuberculosis, soldiers who had tuberculosis were often too weak and ill to serve in the army. However, despite attempts to discharge those with tuberculosis, it was often a challenge to identify those who were suffering from the disease.

Some of the challenges involved in identifying soldiers suffering from tuberculosis were due to difficulty with diagnosis and lack of appropriate diagnostic equipment. Of the three basic forms of tuberculosis, only cutaneous tuberculosis could be diagnosed without specialised equipment. Some strains of tuberculosis, such as the pulmonary strain, could also be diagnosed due to the fast progression of symptoms. Other strains, such as tuberculosis in the bones, could remain undetected for longer. Another form of tuberculosis, Koch's bacillus, also remained largely undetected. However, Koch's bacillus would then fully develop due to external factors such as the deterioration of the soldier's living conditions, specifically food and housing. Although the army attempted to maintain living standards for the soldiers during World War I, this was not always possible and tuberculosis spread among them.

In addition to the aforementioned challenges due to diagnostics, the soldiers were also at an increased risk of developing or transmitting tuberculosis due to frequent colds or exposure while admitted to a hospital for a different purpose. Soldiers who were victims of violence or who had sur-

vived a gas attack were also more vulnerable to the disease.[32] The soldiers' lifestyle also contributed to the spread of tuberculosis, specifically excessive use of tobacco or alcohol.[33] These substances impacted the soldiers' lungs, which were targeted by of Koch's bacillus. In addition to damaging the lungs, these substances generally weakened the body and immune system.

Treatment of tuberculosis

At the outbreak of the First World War, the organisation of the German armed forces' sanitary services was based on the Kriegssanitätsordnung of 1907,[34] which remained the legal basis for the operation of military medical services in the Reich throughout the Great War.

The German sanitary services were headed by the Chief of the Field Sanitary Service (Chef des Feld Sanitätswesens who organised and delegated tasks throughout the ranks. The delegated tasks were the responsibility of the army, corps, divisional doctors, and rear echelon doctors who worked with rear echelon inspectors. The echelon inspectors were responsible for coordinating the work of medical units in the rear. One or two medical companies were assigned to each German infantry division, and the bag-

[32] *Sanitätbericht über das Reichsheer für das Jahre 1933…*, p. 16.

[33] Alcohol was an important part of military life. Liquor was often part of military food rations. In the Austro-Hungarian Army, 0.5 l of wine was issued per soldier per day, which could be substituted for 0.75 l of beer or 0.1 l of spirits. During the war, the consumption of alcohol provided the soldiers with a distraction, however fleeting, from the danger threatening them or memories of civilian life. In peacetime, it was one of the most popular ways of spending free time. This may have engendered the problem of alcoholism, which facilitated the spread of tuberculosis. Although, according to statistics, the number of Reichsheer soldiers suffering from chronic alcohol poisoning, characteristic of addicts, was small – two people a year – these figures do not seem to reflect the full problem, since the records only include cases requiring hospitalisation. There may well have been many more addicts. Cf. *L-2*, pp. 3, 7; Н. Гумилёв, op. cit., p. 13; A. Krasicki, op. cit., p. 159; J. Błachnio, *Alkohol w cesarsko-królewskiej armii podczas kampanii karpackiej 1914–1915*, in: *Alkohol w wojsku i na wojnie. Z dziejów wojskowości polskiej i powszechnej*, "Seria Homo Militans", vol. 7, Oświęcim 2018, pp. 207–208; *Sanitätbericht über das Reichsheer für das Jahr 1930…*, p. 29.

[34] *Kriegs-Sanitätsordnung (K.S.O.) vom 27. Januar 1907*, Berlin 1907.

gage train of each army corps included twelve field hospitals with only four in the reserve corps. Further medical facilities were subordinate to the rear services. These medical facilities included one patient transport department, one echelon medical reserve, and a number of military hospital units assigned to the echelon inspectors. Additionally, seventeen medical trains, including six auxiliary trains remained at the disposal of the arm.

As the War continued, the organisation of sanitary and medical services evolved. Each division was assigned one medical company and two field hospitals. The remainder of the medical units were held in reserve.[35] Despite the availability of medical units, the priority for the medical units was caring for the wounded soldiers, not soldiers diagnosed with an infectious disease. However, as the war progressed and the living conditions of the soldiers continued to worsen, medical units also prioritised the treatment of those with infectious diseases.

During times of peace, the sanitary and medical units were again required to adapt to demands. Due to the decrease in physical combat, there were less wounded soldiers. However, the proportion of patients with infectious diseases continued to rise significantly. In the Reichsheer, thirty-eight garrison hospitals (as of 1924) and ten field hospitals (located in training grounds and used for treatment during drills), were used for soldiers. In addition to hospitals within the Reichsheer, military patients were also admitted to four civilian hospitals. As such, one military medical facility cared for a maximum of approximately 2,273 soldiers. It should be noted that the Medical Personnel of the Reichsheer was composed of a mixture of military personnel and civilians.[36]

One of the tasks of the medical service was to eradicate tuberculosis in the ranks of the army. It seems, however, that its implementation must have been of limited effectiveness, since before the outbreak of the Second World War no anti-tuberculosis drugs were known.[37] This limited the arse-

[35] H. Cron, *Die Organisation des deutschen Heeres im Weltkriege dargestellt auf Grund der Kriegsakte*, Berlin 1923, pp. 158–159.

[36] J. Centek, *Reichsheer ery Seeckta (1921–1925)*, Warszawa 2010, pp. 181–182; M. Schwarte, *Die deutsche Wehrmacht im Wort und Bild*, Charlottenburg 1924, pp. 62–64.

[37] The first antibiotic to combat Koch's bacillus – streptomycin – was only successfully isolated in 1943. Cf. L. Brynder, F. Condrau, M. Worboys, *Tuberculosis and its his-*

nal of measures used against Koch's bacillus to surgical treatment, climatic treatment and prophylaxis.

The treatment of tuberculosis with climatic influences consisted of placing the patient in conditions that made it difficult for mycobacteria to grow.[38] This type of treatment was beyond the capabilities of the armed forces, as it required the maintenance of specialised centres. In addition, climate treatment was associated with the long-term exclusion of the patient from service, so soldiers assigned to this type of treatment were on leave or dismissed from the ranks.

In the German armed forces, tuberculosis was mainly treated in military hospitals. It should be noted that TB patients did not constitute a significant proportion of the hospitalised patients. This may be explained by the relatively small number of soldiers infected with tuberculosis and the fact that in general only the most severe cases were qualified for hospital treatment.[39]

In the first half of the 20th century, one of the primary methods of treating tuberculosis, regardless of its form, was surgery – and not only by military doctors. In 1930, operations for the treatment of Koch's bacillus-induced diseases accounted for just over 3% of all procedures carried out by the Reichsheer's sanitary services. The vast majority of these were operations on the lungs (pneumothorax induction – pneumothorax, oleothorax, thoracocoagulation and thoracoscopy) and respiratory muscles (diaphragmatic nerve palsy), which accounted for 94% of tuberculosis-related operations in 1930. Operations of other types were performed in isolated cases. A successful operation, although leading to at least a temporary improvement in the patient's condition, was not able to restore full function. In 1930, only about 1.5 per cent of soldiers operated on for tuberculosis were considered fit for further service (having undergone surgery for epididymal tuberculosis). Three years later, the figure was almost 13%, and in 1935, it

tories: Then and now, in: *Thuberculosis then and now. Perspectives on the history of an infectious disease*, eds. F. Condrau, M. Worboys, Montreal–Kingston 2010, p. 4

[38] S. M. Tuli, *Historical aspects of Pott's disease (spinal tuberculosis) management*, "European Spine Journal" 2013, vol. 22, supplement issue 4, June, pp. 529–538.

[39] *Sanitätbericht über das Reichsheer für das Jahr 1930…*, p. 99.

was more than 17%, but these percentages could hardly be considered high either. There were at least two factors underlying this. Firstly, the operations did not solve the root cause of the problem, as the tuberculosis bacteria were still active in the affected organism, allowing the disease to continue to develop. As the most debilitated TB patients were brought to the operating table, this meant a high risk of rapid relapse. Secondly, tuberculosis treatments were extremely invasive and most often inextricably linked to loss of full fitness, without which military service was impossible.[40]

The most effective way to prevent the spread of tuberculosis in the army would have been to completely eliminate those infected from the ranks. As mentioned above, the German Reichswehr did not opt for such a solution, although the detection of even inactive TB was possible thanks to tuberculin (primitive tuberculin tests had already been carried out in European armies before the outbreak of the First World War).[41] The German military authorities also chose not to isolate sick soldiers in special units. The abandonment of this solution, which was familiar to the Austro-Hungarian army from the late phase of the war, was probably determined by the different specialisations practised by the sick, which the army could not use effectively if soldiers were seconded from their home units.[42] Thus, the basic form of prophylaxis remained the hygienic regulations mentioned previously and known since at least the end of the 19th century.

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[40] T. Dormandy, op. cit., pp. 352–353; *Handbook of tuberculosis. Molecular biology and biochemistry*, eds. S. H. E. Kaufmann, E. Rubin, Weinheim 2008, p. XXVI; *Sanitätbericht über das Reichsheer für das Jahr 1930…*, pp. 83–98; *Sanitätbericht über das Reichsheer für das Jahre 1933…*, pp. 80, 82–83, 87, 100, 109.

[41] In 1890, Robert Koch isolated tuberculin (a protein obtained from the culture of the tubercle bacillus) in his search for a tuberculosis vaccine, and at the beginning of the 20th century, Clemens Peter von Pirquet (in 1907), Charles Mantoux (in 1908) and Ernst Moro (in 1909) developed tests using it that made it possible to detect even inactive disease, but these advances spread very slowly (they began to be used more frequently in the late 1920s). The low accuracy of the tests (pure tuberculin was not obtained by Florence Seibert until 1931) and the lack of effective anti-tuberculosis drugs, so that the diagnosis of inactive tuberculosis could not be followed up with therapy, were responsible for this state of affairs. Cf. *Handbook of tuberculosis…*, p. XXVI; T. Dormandy, op. cit., pp. 142, 206; KA ZSt KM HR Akten 4900, 43–8.

[42] B. Biwald, op. cit., p. 662.

Similar regulations were also applied in civilian society. In addition, German anti-tuberculosis regulations included orders requiring sick and healthy prisoners to be separated, appropriate antisepsis to be administered, and meat or milk from tuberculous cows to undergo heat treatment.[43] In view of the relatively low standard of living of much of the population, the effectiveness of these orders was limited.

Similarly, the effects of tuberculosis vaccination remained limited.[44] As a result of medical errors, such as the administration of tuberculosis bacteria instead of BCG to vaccinated children in Lübeck in 1930 (as a result, half of the group to be vaccinated contracted tuberculosis and a quarter died), confidence in the vaccine and therefore its application grew slowly between the wars.[45] Furthermore, the vaccine was intended to produce immunity in children, so it was only in the long term that it could affect the scale of adult morbidity and mortality and thus cause an epidemiological crisis in the army.

Summary

In conclusion, in the context of tuberculosis, the professional armed forces formed by voluntary enlistment are not an ideal mirror, but rather a hall of mirrors at a funfair reflecting a caricature of reality. While it is true that military personnel and civilians do suffer from the same diseases, the analogy, despite the often common factors favouring the spread of the disease, is only apparent, as the scale of the incidence and the capacity to deal with the problem differ.

[43] M. Pistor, *Grundzüge einer Geschichte der Preussischen Medizinalverwaltung bis Ende 1907*, Braunschweig 1909, pp. 155–157. It should be noted that the usual methods for the heat treatment of meat did not always lead to complete elimination of Koch's prats. Cf. K. Waddington, op. cit., p. 65.

[44] The BCG vaccine, which is also used today, was developed by Albert Calmette and Camille Guérin between 1906 and 1921. Primarily intended for children, however, vaccination did not become widespread before World War II. Cf. T. Dormandy, op. cit., p. 347; *Handbook of tuberculosis…*, p. XXVI.

[45] *Historia medycyny*, ed. T. Brzeziński, Warszawa 2015, p. 433.

The main cause of the rise in tuberculosis in the German army between 1914 and 1935 was the decline in the living standards of German soldiers and civilians. This was most pronounced during the First World War (collapse of agricultural production, difficult combat conditions) and in the early 1920s (economic crisis). In the former period, there was a marked increase in tuberculosis in the conscripted German army, and in the latter, the percentage of tuberculosis in the professional army remained higher than before the Great War. It should be emphasised that due to the peculiarities of *Myconacterium tuberculosis*, which can remain inactive in the human body for a long time, the effects of the events of the second and early third decades of the 20th century were still felt in the Reichsheer in the 1930s.

The course of the First World War and the provisions of the Treaty of Versailles also triggered a change in the attitude of the highest German military authorities towards tuberculosis patients. Wartime losses and later the ban on general conscription led to a situation in which those struggling with Koch's bacillus remained in service, whereas before the First World War, efforts had been made to eliminate them. This was primarily determined by staff shortages, although after 1921 the small size of the contingent that could be released from the ranks each year was also not insignificant. So, at the beginning of the interwar period, it became apparent from the point of view of the military authorities that it was more important to recruit the most competent soldiers for the army than to counter the epidemiological threat. For this reason, the Germans did not make use of the possibility (within the framework of the diagnostics of the time) of completely eliminating tuberculosis patients from the ranks of the armed forces. In the long term, this may or may not have led to the further spread of TB.

On the battlefield against this disease, the military used similar methods to civilian society – prevention and treatment based primarily on personal and environmental hygiene. The latter most often took the form of surgery in the armed forces. Climatic treatment, on the other hand, should be considered negligible, not to say non-existent, as it was associated with long-term leave or permanent removal of a soldier from the ranks. In this field, a clear difference was marked between the armed forces and civilian society. The military, having detected terminal cases of the disease, had the possibility to dismiss the infected soldier from service, so that treating him further

and preventing him from infecting others virtually ceased to be a problem for the armed forces. Civilian society did not have such possibilities. For the above reasons, when using military material in researching certain aspects of how society functions based on the analogy of the army as a reflection of civilian life, one must be very cautious.